
Chapter 2 — ISDN features

ISDN allows us to create a truly intelligent network based on its out-of-band signaling and intelligent messaging. New features have been developed to take advantage of these new capabilities. In addition, many existing features which were previously limited to Meridian 1/SL-1 internal uses have only now been expanded to the entire network. We refer to this as Network-wide feature transparency.

Features such as Calling Line Identification are now network wide features and can be sent to and received from other Meridian 1/SL-1 systems and DMS-100 central offices.

ISDN is an evolving product and new releases of software will introduce additional feature capability and connectivity.

This chapter will describe every ISDN related feature, and identify the required software packages for each feature, as well as provide operating parameters and feature neurotoxins.

64 kbps Clear Data Transport

ISDN PRI supports clear 64 kbps data transport on each B-channel. Connections from a Meridian 1 Option 21-71 tandeming through a Meridian 1 Option 11 to another Meridian 1 Option 21-71, SL-100, DMS-100, or other central office switch are supported over 64K clear transmission.

Package Requirements

This feature requires the following options:

ISDN	option 145
DTI	option 75
PRI	option 146

Attendant and Network Wide Remote Call Forward

Prior to Release 20, the Remote Call Forward (RCFW) feature allowed a user to administer call forward from a remote set within the Meridian 1 or from outside the Meridian 1 through the Direct Inward System Access (DISA) number. The RCFW feature was not available on a network wide basis, nor was it applicable to Attendant Consoles. This enhancement introduces the RCFW feature across the Meridian Customer Defined Network (MCDN), while also providing the attendant with RCFW capabilities. New ISDN FACILITY messages are used to facilitate the RCFW feature operation in an MCDN.

The feature capabilities of the set-based (Flexible Feature Code activated) network wide application of the RCFW feature match those of the current standalone RCFW feature.

The attendant RCFW functionality is controlled by a new flexible Attendant key (RFW). The attendant has the capability to view the current call forward number and determine the call forward status of any station. It is also possible for an attendant to activate or deactivate call forward for a particular station. This functionality is applicable both local within the Meridian 1 and network wide.

A new optional customer-based password is introduced for attendant RCFW operation. This password is configured in LD 15 and is the only password required for attendant RCFW operation. The station control password previously used by the Flexible Feature Code (FFC) set-based RCFW is not required when the attendant activates RCFW by pressing the RFW key.

Operating parameters

The network wide application of this feature is only applicable to nodes in an MCDN. The nodes in the network must be Meridian 1 switches, running a minimum of Release 20 software. No other Central Office (CO) or PBX type is supported for this feature operation.

For set-based network operation of the Remote Call Forward feature, the Station Control Password Length (SCPL) must be configured to be the same length for all nodes in the network. Attempts to operate RCFW with different SCPLs will result in overflow tone being presented to the user.

For network operation of the RCFW feature, the Private Network Identifier (PNI) must be configured consistently for all nodes in the network.

The Attendant and Network Wide RCFW features use the existing RCFW code to activate or deactivate call forward on stations. As such, all limitations applicable to the local RCFW feature are applicable to the network and attendant operation of the feature.

As the Swedish CD Attendant Console does not support alpha characters, the “PWD” prompt is not displayed on the console’s digit display when a password is required. The indication that a password is required is limited to the winking RFW key lamp.

No new hardware is required for this feature.

Feature interactions

Feature interactions for Attendant and Network Wide Remote Call Forward are described below.

Outpulsing of Asterisk and Octothorpe (OAPO)

If the OAPO package is equipped, the “#” will be treated as any other dialed digit and will not be used to signal end of dialing. The end of dialing digits to be used are defined in LD 15.

BRI

Since ISDN BRI sets do not support Flexible Feature Codes, Remote Call Forward cannot be activated from a BRI set.

Multiple Appearance DNs

The RCFW feature only applies to the primary appearances of Multiple Appearance DNs, and it is recommended that only one appearance of a Multiple Appearance DN be configured as the prime DN.

For the case of multiple stations with the same prime DN and SCPW, the RCFW operation will apply to the station that has the Multiple Appearance Redirection Prime (MARF) assigned to it.

If none of the stations having the DN and SCPW assigned are configured as the MARF TN for that DN, the RCFA and RCFD will apply to all stations matching the DN and SCPW.

For the case of multiple stations with the same prime DN and SCPW, the RCFW operation will apply to the station that has the Multiple Appearance Redirection Prime (MARF) assigned to it.

The attendant-based RCFW feature will only apply remote call forward operation to the prime DN with MARF status. If the DN is not the prime DN or does not have MARF status, overflow tone will be received by the user.

Call Forward Activation from any Feature/Call Forward and Busy Status

There are no direct conflicts with either of these features and the RCFW feature.

Preventing Reciprocal Call Forward

When Preventing Reciprocal Call Forward Allowed (PVCA) is defined in LD 15, a set within the same customer configuration cannot be call forwarded to a set that is call forwarded back to it. Thus, CFW loops are prevented.

This feature applies when the CFW DN is changed by Remote Call Forward. For network operation of the set- and attendant-based RCFW features, entering an invalid CFW DN (under the rules of the PRCF feature) results in overflow tone being returned and the CFW DN being ignored.

Phantom TN

A Phantom TN does not physically exist, but can be configured with limited hardware associated with it (i.e., no sets or line cards); however, all required data blocks are configured.

The Phantom TN feature uses the RCFW feature to configure and activate/deactivate the CFW DN on the Phantom TNs.

As the data blocks associated with Phantom TNs match those of standard analog (500/2500 type) telephones configured within the Meridian 1, the operation of the RCFA and RCFD features on Phantom TNs is transparent to the RCFW feature. As such, the set-based local and network RCFW features can be used to configure and activate/deactivate the CFW DN of Phantom TNs.

The Phantom TN feature uses a Default Call Forward (DCFW) DN. If call forward is not active on the Phantom TN, all calls to the Phantom TN DN are routed to the DCFW DN.

The Phantom TN feature modifies the set-based RCFW feature so that if CFW is not active on the Phantom TN, and the CFW DN entered in the RCFV operation matches the DCFW DN, confirmation tone is returned to the RCFV user; if the CFW DN entered does not match the DCFW DN, overflow is returned.

This change to the set-based RCFV operation is applicable to the network RCFV operation. The operation of this feature network wide requires no changes to the ISDN message passing for the set-based network RCFV operation.

There is no Attendant RCFW operation which interacts with the DCFW DN of Phantom TNs.

Traffic Measurements

The peg count, for the attendant RFW key, will be generated on the first RFW key press of the RCFW operation. While the RFW key may be pressed multiple times during a single RCFW function, the peg count will only be implemented once.

The RFW key peg count will be included in the TFC005 feature key usage traffic report.

Feature packaging

The Attendant Remote Call Forward (ARFW) package 253 must be provisioned to activate the Attendant-based RCFW feature.

For network operation the following software packages are required: Integrated Services Digital Network (ISDN) package 145; Network Alternate Route Selection (NARS) package 58; and any other trunk or dialing plan packages as required by the customer's configuration.

The following are prerequisites for set-based RCFW: Optional Features (OPFT) package 1; Flexible Feature Codes (FCC) package 139; and Controlled Class of Service (CCOS) package 81.

The following are prerequisites for implementation on analog (500/2500 type) telephones: Special Service for 2500 Sets (SS25) package 18; and 500 Set Dial Access to Features (SS5) package 73.

Attendant Blocking of DN

Attendant Blocking of Directory Number (DN) allows a person to dial the attendant DN and request an external (long distance) call, and then disconnect while waiting for the call to be processed by the attendant. The requesting DN is idle and can receive and make calls.

When the attendant is ready to make the external (long distance) call, the Attendant Blocking of DN feature provides the attendant with the ability to block the DN while the external call request is being processed. The line appears busy to any caller attempting to contact the blocked DN. The blocked DN cannot be used to originate a call and will be connected to the attendant if it goes off hook. When the attendant has completed the external call, the blocked DN can be rung and the call extended. The attendant is guaranteed that the requesting DN is not busy and is available to take the call when the processing has been completed. This feature works in both standalone and Meridian Customer Defined Network (MCDN) environments.

Previously, this feature had been available on Swedish A345 PBXs, but now is also available on the Meridian 1. Although developed for Telia Sweden, the feature is applicable to all marketplaces desiring Attendant Blocking of DN functionality.

Operating parameters

The Attendant Blocking of DN feature can only be activated as the source party of the Loop key on the Attendant Console.

The attendant has the ability to use the Attendant Blocking of DN feature only for the following types of DNs: sets with ordinary Single Call Arrangement Non Ringing key (SCN)/Single Call Arrangement Ringing key (SCR) DNs and analog (500/2500 type) sets. HOT DNs, Multiple Call Arrangement None Ringing key (MCN)/Multiple Call Arrangement Ringing key (MCR) DNs, Automatic Call Distribution (ACD) DNs, Primary Line DNs (PLDNs), any trunk access code, Flexible Feature Codes (FFCs), Basic Rate Interface (BRI) and all other types of extensions are considered to be invalid for the Attendant Blocking of DN feature.

When the Attendant Blocking of DN feature is activated for a DN, it is only the DN dialed that is blocked. Other DNs assigned to the set will be idle.

If Attendant Blocking of DN is attempted on a Multiple Appearance Single Call Arrangement DN, all idle appearances of the DN will be blocked.

The Attendant Blocking of DN will only be supported on the following Attendant Console types: M2250; M1250; QCW4; QCW8; or M345CD.

No new hardware is required for this feature.

Feature interactions

ACD

It is not possible to activate the Attendant Blocking of DN feature for an ACD DN. If an attempt to block an ACD DN is made, the attempt will be canceled and overflow tone will be returned. However, individual DNs on ACD sets can be blocked.

Attendant Hold

An Attendant Blocking of DN call can be put on hold by the attendant and will in this case be subject to normal Attendant Hold treatment. The Semi-automatic Camp-on (SACP) key lamp will be dark while on hold and be lit again when taken off hold. The same applies to Automatic Hold on the Loop key.

Attendant Break-in

The Attendant Blocking of DN and the source side Predial Break-in features are mutually exclusive for the same call. If the SACP key lamp is lit when the Break-in key is pressed to start a Predial Break-in attempt, the Break-in key is ignored. On the contrary, if the Break-in key lamp is lit and no call attempt is made on the source side when the SACP key is pressed to start an Attendant Blocking of DN, the SACP key is ignored.

If a Break-in attempt is made for an Attendant Blocking of DN call, the Break-in attempt will be considered to be temporarily denied.

It will be possible to Break-in on the destination side with an Attendant Blocking of DN call on the source side of the Attendant Console. The same limitations to Break-in will apply as if the source side call is a normal call.

Busy Lamp Field/Enhanced Busy Lamp Field

When a DN is blocked due to the Attendant Blocking of DN feature, the Busy Lamp Field/Enhanced Busy Lamp Field lamp corresponding to this DN displays the busy status of the DN as for ringing calls.

Busy Verify

The Attendant Blocking of DN and source-side Busy Verify are mutually exclusive for the same call. If the SACP key lamp is lit when the Busy Verify key is pressed to start a Busy Verify attempt, the Busy Verify key is ignored. On the contrary, if the Busy Verify lamp is lit when the SACP key is pressed to start an Attendant Blocking of DN attempt, the SACP key is ignored.

If a Busy Verify attempt is made on an Attendant Blocking of DN call, it will be denied.

Call Detail Recording Time to Answer

If the CDR Time to Answer feature is active, the time registration before answer will be started when the SACP key is pressed to ring the blocked DN and not when the DN is blocked.

Call Forward All Calls/Internal Calls/Call Forward and Busy Status

The Attendant Blocking of DN feature will override these Call Forward features. If the dialed DN of the set is idle, the DN can be blocked; if the DN is busy, busy tone will be heard.

Call Forward No Answer

The Attendant Blocking of DN feature will override the Call Forward No Answer feature. If the blocked DN of the set has the Call Forward No Answer feature active when the SACP key is pressed to ring the DN, the DN will ring until answered or disconnected. No Call Forward No Answer will be done for the Attendant Blocking of DN call.

Call Park

It is not possible to park an Attendant Blocking of DN call. If a Call Park call recalls to a blocked DN, the recall will be treated as if the DN is in a ringing state.

Call Waiting

If a set that has the Station-to-station Call Waiting feature active (CLS SWA and a Call Waiting (CWT) key for SL-1 and digital sets) is idle when an Attendant Blocking of DN attempt is made, the Attendant Blocking of DN attempt will be allowed and processed as normal. If the DN is idle and there is an active call on the Call Waiting key, the Attendant Blocking of DN attempt will be allowed.

If a set has the Station-to-station Call Waiting feature active and the DN to be blocked is busy when an Attendant Blocking of DN attempt is made, the Attendant Blocking of DN attempt will be canceled and busy tone will be returned.

For a set that has the Call Waiting (or Station-to-station Call Waiting) feature active and a DN is blocked due to the Attendant Blocking of DN feature, any incoming call to the blocked DN will receive busy tone.

Camp-on

Camp-on will be denied for a DN that is blocked due to the Attendant Blocking of DN feature.

Directory Number Delayed Ringing

The Attendant Blocking of DN feature will override the Directory Number Delayed Ringing feature and ring the blocked DN immediately when the SACP key is pressed to ring the blocked DN.

Do Not Disturb

The Attendant Blocking of DN feature will override the Do Not Disturb feature. If the dialed DN of the set that has the Do Not Disturb feature active is idle, the DN will be blocked and if the DN is busy, busy tone will be heard.

FFC Boss Secretary Filtering

The FFC Boss Secretary Filtering feature will be overridden. If an Attendant Blocking of DN attempt is made for a set that has the Boss Secretary Filtering feature active, the dialed DN will be blocked if idle. If it is busy, busy tone will be heard.

Flexible Feature Codes

If a Flexible Feature Code is dialed after pressing the SACP key to initiate an Attendant Blocking of DN attempt, overflow tone will be provided and the attempt canceled.

Group Hunting

It is not possible to activate the Attendant Blocking of DN feature for a Pilot DN (PLDN). If an attempt is made to block a PLDN, the attempt will be canceled and overflow tone will be returned. If a DN that is a member in a Group Hunt (or Hunt) list is blocked by the Attendant Blocking of DN feature, the DN is considered to be busy.

HOT DN

It is not possible to activate Attendant Blocking of DN for a HOT DN extension. If an attempt to block a HOT DN extension is made, the attempt will be canceled and overflow tone will be returned.

Hunting

If Attendant Blocking of DN is attempted on a busy DN having the Hunting feature active, busy tone will be returned (overriding the Hunting feature).

ISDN Basic Rate Interface (BRI) Trunk Access

It is possible to use the Attendant Blocking of DN feature in an ISDN MCDN based on BRI TIE trunks if Network Attendant Service (NAS) is configured in the network.

Line Lockout

If an Attendant Blocking of DN attempt is made on a set in Line Lockout state, busy tone will be returned.

Make Set Busy

The Attendant Blocking of DN feature will override the Make Set Busy feature. If the dialed DN of the set that has the Make Set Busy feature is idle, the DN will be blocked and if the DN is busy, busy tone will be heard.

Multiple Appearance Multiple Call Arrangement

It is not possible to activate the Attendant Blocking of DN feature for a Multiple Appearance Multiple Call Arrangement DN (MCA DN (MCN/MCR)). If an attempt is made to block an MCA DN (MCN/MCR), the attempt will be canceled and overflow tone will be returned.

Multiple Appearance Single Call Arrangement

If Attendant Blocking of DN is attempted on a Multiple Appearance Single Call Arrangement DN (SCA DN (SCN/SCR)), all appearances of the DN will be blocked.

New Flexible Code Restriction

When the attendant has a blocked DN on the source side and dials on the destination side, any New Flexible Code Restriction active for the set of the blocked DN will be overridden. This is the same as if the attendant had a normal established call to the DN on the source side and dials the destination side.

Phantom TN

DNs on Phantom TNs will not be overridden by the Attendant Blocking of DN feature.

Radio Paging

If a transferred Radio Paging call recalls to a blocked DN, the recall will be treated as if the DN is busy.

Ring Again

It is possible to activate Ring Again towards a DN that is blocked due to the Attendant Blocking of DN feature.

Ringling Change Key

When the SACP key (or Signal Source) key is pressed to ring a blocked SCR where the Ring Change feature is activated, an audible ring signal will always be given. This is independent of the Ring Change status.

Ring/Hold LED Status

When a DN is blocked, the status of the DN lamp will be the same as for a call put on hold.

Semi-automatic Camp-on

The Attendant Blocking of DN feature uses the SACP key to activate a blocking attempt, but the Attendant Blocking of DN feature is only valid on the source side of the Attendant Console. The Semi-automatic Camp-on feature is only valid on the destination side of the Attendant Console.

To have the Attendant Blocking of DN feature available and not the Semi-automatic Camp-on feature, a new response to the SACP prompt has been introduced in LD 15. Prompt SACP = NO means the Semi-automatic Camp-on feature is not available even if the SACP package is equipped and an SACP key exists on the Attendant Console. To have the Semi-automatic Camp-on feature available the SACP prompt must be answered with SNGL or ALL which have the same meanings as before.

Signal Source

The Signal Source key can be used to notify a blocked DN. Using the Signal Source key for an Attendant Blocking of DN call will give the same response as the SACP key when the DN is blocked (i.e., ring the blocked DN and darken the SACP key lamp). The Signal Source key cannot be used to initiate an Attendant Blocking of DN call.

Single Call No Ringing DN

When the SACP (or Signal Source) key is pressed to ring a blocked Single Call No Ringing DN (SCN), an audible ring signal will be given.

Source Included when Attendant Dials

The Attendant Blocking of DN feature will follow the current Source Included when Attendant Dialing handling.

Vacant Number Routing

The Attendant Blocking of DN feature will work across an ISDN network if the call is routed due to the Vacant Number Routing feature.

Feature packaging

The Attendant Blocking of DN feature is packaged under Semi-automatic Camp-on (SACP) package 181.

To work in an ISDN network environment, Network Attendant Services (NAS) package 159 is required.

Feature Implementation

LD 12 – Configure the SACP key on the Attendant Console.

Prompt	Response	Description
REQ	CHG	Change.
TYPE	ATT, 1250, 2250	Attendant Console type.
TN	c u	Terminal Number for the Option 11.
...		
KEY	xx SACP	Semi-automatic Camp-on key.

LD 15 – This overlay has been modified to enable the Attendant Blocking of DN feature.

Prompt	Response	Description
REQ	CHG	Change.
TYPE	CDB ATT	Customer Data Block. Release 21 gate opener.
CUST	0-31	Customer number.
...		
ATT	YES	Change Attendant Console options.
...		
- SACP	(NO), ALL, SNGL	Semi-automatic Camp-on not allowed. Semi-automatic Camp-on for all Camp-on occurrences. Semi-automatic Camp-on on a per call basis.
- ABDN	(NO), YES	Activation of the Attendant Blocking of DN feature is (not) allowed. The ABDN prompt only appears when the SACP package is equipped.

Feature operation

To block a DN

- 1 The attendant presses an idle Loop key.
- 2 The attendant presses the Semi-automatic Camp-on (SACP) key.
- 3 The SACP key lamp lights.
- 4 The attendant dials the source DN that is to be blocked. If the dialed DN is idle, the DN lamp will have the same state as a call put on hold, but the DN will not ring. If the DN is busy, the attendant hears busy tone and the SACP key lamp darkens.

If the dialed DN is idle, it is blocked. The DN lamp indicates a call on hold state, although the DN will not ring (for analog [500/2500 type] telephones, there is no indication that the DN is blocked). On the Attendant Console, the SACP key lamp remains lit and the Source key lamp begins blinking.

If the dialed DN is busy, the attendant presses the Release (or Release SRC) key to release the call.

To place an outgoing call for the blocked DN

- 1 The attendant establishes a call to the desired destination in the normal way.
- 2 The attendant presses the SACP (or Signal SRC) key. The ringback tone is heard.
- 3 If the source DN answers, the attendant presses the Release key to extend the call between the destination to the source.

To release a blocked DN

The attendant presses either the SACP key or Signal Source key to ring the DN

—or—

The attendant presses either the Release key or the Release Source key to release the source DN, which then becomes idle.

To notify a blocked DN of an established call

The attendant presses the SACP or Signal Source key.

Automatic Trunk Maintenance (ATM)

ATM is not supported on the Option 11 system.

B-Channel Overload Control

The B-Channel Overload Control feature provides a solution to the problem situation of having a high rate of incoming calls from a Central Office over ISDN PRI trunks to busy destinations on a Meridian 1¹, causing slow dial tone and other realtime overload type problems on the Meridian 1.

The feature delays the release of an ISDN PRI call by using a configurable timer (BCOT) when a call encounters a busy condition. The delay in releasing the seized B-Channel prevents a new call from being presented on the same B-Channel. This delay cumulatively results in decreasing the incoming call rate, thereby avoiding degradation of real-time response. This delay is applied using ISDN protocol compliant messaging. The delay is in milliseconds, so that it is virtually transparent to the caller.

The value for the B-Channel Control timer is configured in Overlay 16, on a per-route basis. Although a value from 0-4000 milliseconds is accepted, a value of 256 is recommended. The entered value is rounded down to multiples of 128. After a value has been entered and rounded down (if necessary), the value is printed on the screen before the next prompt is displayed. For example, if a value of 400 is entered, the system rounds this value down to 384 and prints 384 on the display. The next prompt is then displayed.

After the BCOT timer expires, the normal disconnect sequence will take place and a new call may be presented.

Figure 1 and **Figure 2** represent a “before-and-after” representation of the B-Channel Overload Control feature application.

1. An example where this could happen would be where a telemarketing firm advertises a product by giving an 1-800 number. In response to the advertisement, the company receives a burst of incoming calls in a short period of time. Many of the calls may receive busy treatment, and in a busy situation, the Meridian 1 rejects the calls.

Figure 1
Before the B-Channel Overload Control Timer has been applied

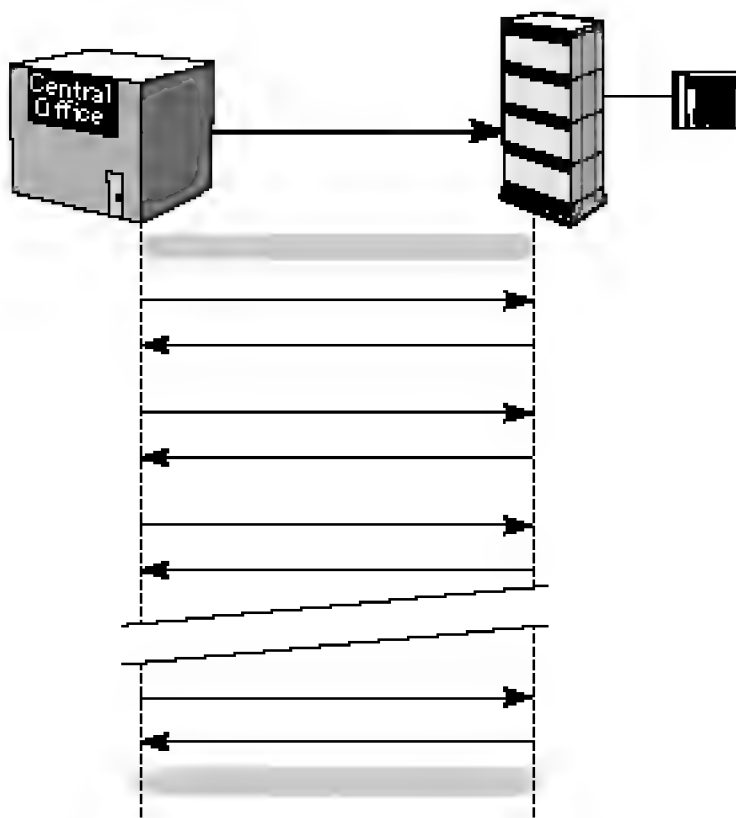
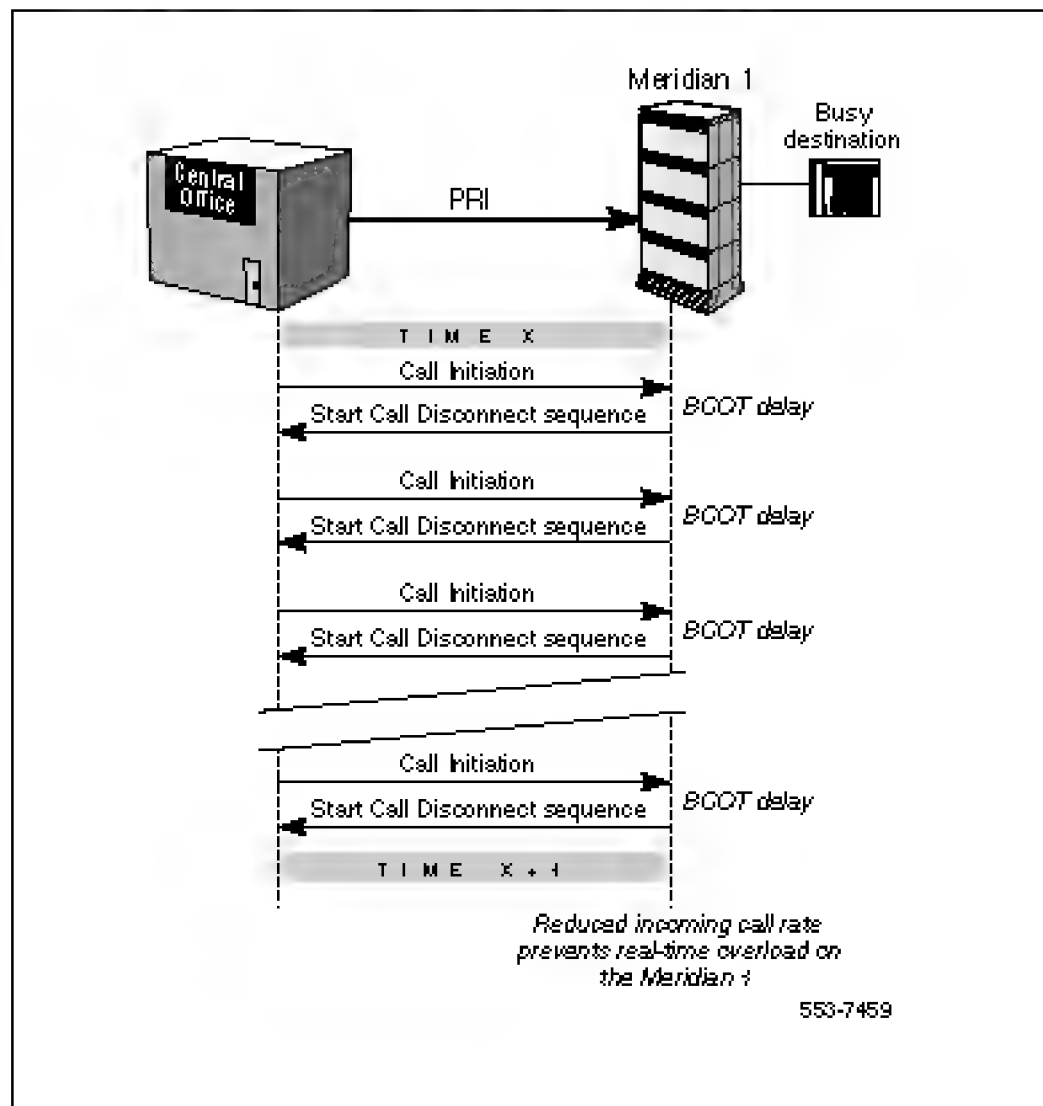


Figure 2
After the B-Channel Overload Control Timer has been applied



B-Channel Overload Control Timer (BCOT) considerations

Please consider the following pertaining to the application of the BCOT:

- When configuring the BCOT in Overlay 16, the recommended value to be used is 256 milliseconds (most problem scenarios can be solved with this value). Even though the maximum value of 4 seconds may be entered, it is suggested that this value not be used (since callers do not receive any audio feedback while the timer is running, they would receive only silence for four seconds).
- After a value is entered in response to the BCOT prompt in Overlay 16, the system rounds this value down by a multiple of 128 milliseconds, if necessary (the actual time delay is in the range of +0 to -128 milliseconds from the entered value). This value is printed before the next prompt is displayed.
- When a system is upgraded for the first time to a software release containing the BCOC feature, all BCOT timers are initialized to 0.
- By default, the BCOC feature is disabled on all routes (BCOT = 0). To activate the BCOC feature for a route, a service change on the BCOT timer is required using Overlay 16.
- A new Peg counts field for the “Total number of activations of BCOC activations for this route” is added to the TFC002 traffic report. This count will apply to all Meridian 1 routes that interface with DMS, Lucent, and NI-2 TR-1268 switches. For the Integrated Services Access (ISA) Call By Call Type and the NI-2 Call By Call Service Selection features, the peg counts are done against the service routes, and not a master route. The peg count for a master route will always be zero.

Refer to Tables and Table 2 for a sample traffic measurement report output.

Traffic measurement output

For non-ISA and non-NI-2 Call By Call service routes, the TFC002 traffic measurement report has been updated for the BCOC feature as shown by **Table 1**.

Table 1**TFC002 format for a non-ISA and non-NI-2 Call By Call routes**

System ID	TFC002
...	
Route Number	Route Type
Total number of trunks configured	Total number of trunks working
...	Total number of incoming calls
...	Total number of outgoing calls
...	...
Total number of activations of BCOC for this route	

For ISA and NI-2 Call By Call service routes, the TFC002 traffic measurement report has been updated for the BCOC feature as shown by [Table 2](#).

Table 2
TFC002 format for an ISA service route.

System ID	TFC002
...	
Route Number	Route Type
Total number of trunks configured	Total number of trunks working
...	Total number of incoming calls
...	Total number of outgoing calls
Total incoming calls on the service route	Total outgoing calls on the service route
Total number of activations of BCOC for this route	

Operating parameters

This feature applies only to the following ISDN PRI to North American Central Office connectivities:

- DMS-100
- DMS-250
- SL-100
- Lucent 4ESS
- Lucent 5ESS and
- National ISDN-2 (NI-2) TR-1268

This feature supports both circuit switched voice and data calls.

This feature does not distinguish between normal busy conditions and overload busy conditions, since its functionality depends on the BCOT value configured at the route level. All busy calls on the route receive the same BCOT treatment.

This feature does not support Virtual Network Services trunks.

This feature is activated for the following call types:

- incoming calls presented on a busy set on a node interfacing directly to a Central Office (see Figure 3 on page 32); or incoming calls from a Central Office being tandemmed to a private network and presented on a busy set (see Figure 4 on page 32)
- incoming calls presented on an ACD DN whose ACD queue has reached its maximum limit
- incoming calls presented on a Controlled Directory Number (CDN), and being released by Customer Controlled Routing (CCR) due to a “User Busy” cause
- incoming calls that are tandemmed to a route whose trunk members are all busy

Figure 3

Busy set is a on node interfacing directly to a Central Office

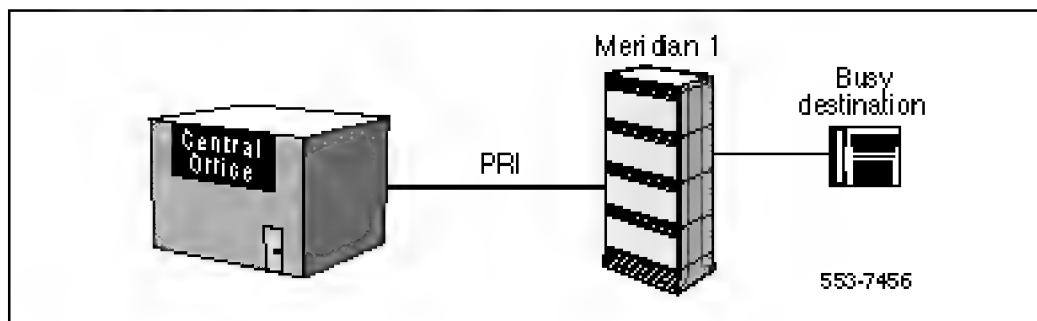
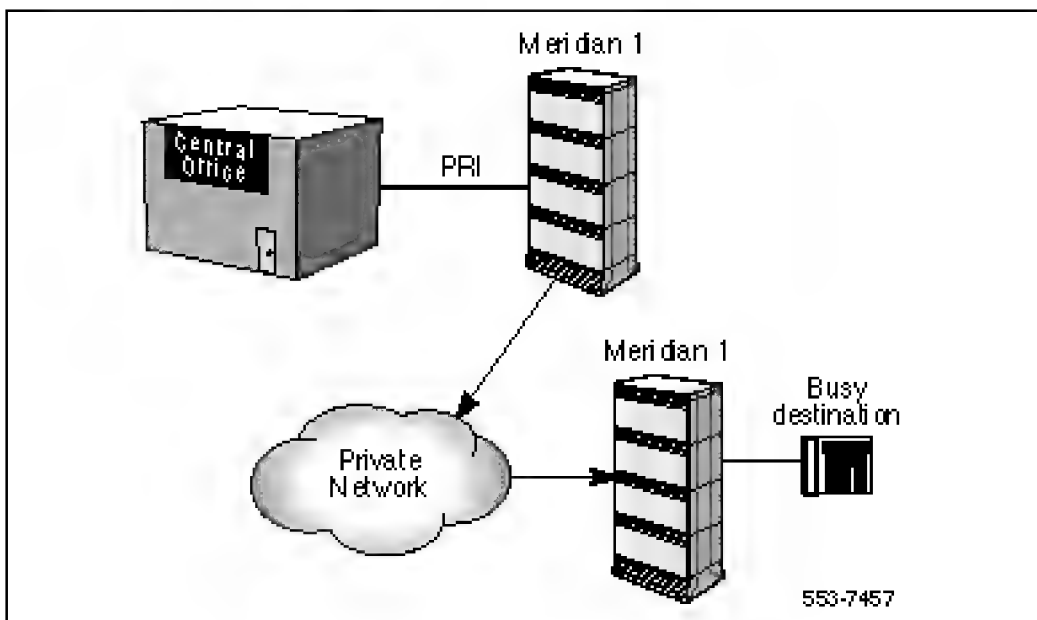


Figure 4

Busy set is a on node tandemed to a Central Office



Feature interactions

Automatic Call Distribution

ACD allows a large volume of calls to be made to the same DN (called the ACD DN), and answered by a group of telephones (called ACD agent positions). Incoming calls are distributed so that the agent that has been idle the longest receives the first call.

Whenever an incoming ACD call gets released immediately due to a “User Busy” cause, the Meridian 1 starts the B-Channel Overload Control timer and sends a “Call Proceeding” message rather than releasing the call immediately (the amount of time, in milliseconds, that the B-Channel remains seized depends on the value entered for the timer in Overlay 16). After the timer expires, the normal disconnect sequence will take place.

Call Interflow

Call Interflow allows an ACD supervisor to redirect excess traffic to an Interflow DN. All Interflow calls that are to be given busytone will be affected by the B-Channel Overload Control feature, in that a delay will be imposed on these calls before the caller receives the busytone.

Enhanced ACD Routing

Enhanced ACD Routing allows different delay treatments to be given to ACD calls from different sources but to the same ACDN DN.

Enhanced ACD Routing uses a Control DN, which does not have agent positions but rather specifies a destination default ACD DN to which incoming calls are directed. Multiple Control DNs can place calls into the same ACD queue, so different treatment can be given to these calls (the treatment given to a call is determined by the parameters defined for the Control DN, and not the ACD queue).

The Control DN has a limit to the number of unanswered calls that it can have at its default DN. Once the limit is exceeded, new calls are given busytone and Central Office calls are placed in the ACD queue. These calls that are to receive busytone will be affected by the B-Channel Overload Control feature, in that a delay will be imposed on these calls before the caller receives the busytone.

Secondary DN Call Blocking

Secondary DN Call Blocking blocks new incoming ACD calls to the Secondary DN of an ACD agent, so that the agent can handle a current call without interruption. The calls to the Secondary DN receive busytone. These calls that are to receive busytone will be affected by the B-Channel Overload Control feature, in that a delay will be imposed on these calls before the caller receives the busytone.

Supervisor Control of Queue Size

Supervisor Control of Queue Size allows ACD DN's busytone to be given to selected call types. These calls that are to receive busytone will be affected by the B-Channel Overload Control feature, in that a delay will be imposed on these calls before the caller receives the busytone.

Integrated Services Access

Integrated Services Access (ISA) allows multiple routes to share the same the common pool of B-Channels for connectivity between a Meridian 1 PBX and a Central Office PBX such as the DMS-100 and the DMS-250. Unlike dedicated routes, which require each service route to have its own trunks of the same trunk type, ISA trunks are shared among many service routes, which can carry calls of different types that can change on a per call basis.

The B-Channel Overload Control feature interacts with ISA in that all incoming calls over an ISA route that are released because of a "User Busy" cause, will be delayed as defined by the B-Channel Overload Control timer.

NI-2 Call by Call Service Selection

NI-2 Call By Call Service Selection allows multiple services to share the same the common pool of B-Channels for an NI-2 TR-1268 PRI interface. Dedicated routes are not required. The service types can be assigned on a per call basis.

Intercept Treatment

All calls that are released by Intercept treatment due to a "User Busy" cause will be delayed as defined by the B-Channel Overload Control timer.

Remote Virtual Queuing

Since Remote Virtual Queuing interworks over a Meridian 1 to DMS interface, the B-Channel Overload Control feature imposes a delay on the automatic retry capability of RVQ, which is used when congestion is encountered due to no idle trunks being available.

Auxiliary Products

All calls that interact with the auxiliary products Customer Controlled Routing (CCR), Integrated Call Center Manager (ICCM), and Meridian Link, and that are being released due to “User Busy” cause, are delayed by B-Channel Overload Control until its timer expires.

Attendant Blocking of DN

This feature enables the attendant to block calls from being made to a DN while an external call request from that DN is being processed. The blocked calls receive busytone.

The B-Channel Overload Control feature interacts with Attendant Blocking of DN in a Meridian 1 to Central Office interface, by imposing a delay on any call coming in from a CO that terminates on a blocked DN and receives busytone treatment due to “User Busy” cause.

Call Connection Restriction

This feature imposes restrictions on a caller’s access to the public network, private network, and services and features. If any restriction is detected when a call is attempted, the call is denied and intercept treatment as defined in the Customer Data Block is applied. If the intercept treatment results in the call being released due to a “User Busy” cause, the B-Channel Overload Control feature imposes a delay on the release.

Meridian Network Services Drop Back Busy and Off Hook Queue

The B-Channel Overload Control feature does not affect the operation of the Drop Back Busy capability. If Off Hook Queuing is active, B-Channel Overload Control will not be activated.

Network Individual Do Not Disturb

This feature allows extends the functionality of the Individual Do Not Disturb feature to a network environment. If a DN is in the Do Not Disturb mode, calls may be made from it, but incoming calls to it would receive Intercept treatment. If the treatment is busytone, the B-Channel Overload Control feature imposes a delay on the release of these calls.

Trunk Barring

This feature allows customers the option of denying certain types of trunk-to-trunk connections. Attempted calls over these trunks would receive Intercept treatment. If the treatment is busytone, the B-Channel Overload Control feature imposes a delay on the release of these calls.

Feature packaging

The B-Channel Overload Control feature requires the following packages:

- Integrated Services Digital Network (ISDN) package 145
- 1.5 Mbps Primary Rate Access (PRA) package 146

Feature implementation

LD 16 – Configure the B-Channel Overload Control timer (in response to the BCOT prompt).

Prompt	Response	Description
REQ	NEW CHG	Add new data Change existing data.
TYPE	RDB	Route Data Block.
...		
ISDN	YES	Integrated Services Digital Network.
...		

- IFC	D100 D250 S100 ESS4 ESS5 NI2	Supported interface types. D100 = DMS-100 D250 = DMS-250 S100 = SL100 ESS4 = Lucent 4ESS ESS5 = Lucent E5SS NI2 = National ISDN-2
...		
-- BCOT	(0)-4000	The value for the B-Channel Control timer, in milliseconds. This value indicates the delay that the Meridian 1 will impose on a B-Channel before starting the disconnect sequence. A value of 256 is recommended. The entered value is rounded down to multiples of 128. After a value has been entered and rounded down (if necessary), the (rounded down) value is autoprinted on the screen before the next prompt is displayed. Refer to “B-Channel Overload Control Timer (BCOT) considerations” on page 28 for more information. Note: <i>In the case of Integrated Services Access (ISA) Call By Call Type and NI-2 Call By Call Service Selection, BCOT is prompted only for Service Routes.</i>
....		

Note: You may print the BCOT timer value that was entered in LD 16 by using LD 21.

Feature operation

No specific operating procedures are required to use this feature.

Backup D-Channel

In order to increase the reliability of the D-Channel and enhance the serviceability of the Primary Rate Interface, a secondary or backup D-Channel is supported.

The Backup D-Channel feature provides redundancy for the NTAK93 D-Channel Handler Interface (DCHI) daughterboard. The D-Channel Handler Interface provides the signaling and protocol for call set-up, call tear down and feature activation. The B-channels can either be PRI B-channels or analog or digital trunks with the ISDN Signaling Link (ISL) feature.

Because the DCHI is so important to customer trunking requirements, an additional D-Channel Handler Interface can be configured so that automatic switchover to the backup DCHI occurs in the case of primary D-Channel failure. This exercise requires co-ordination with the far end to ensure that the backup D-Channel is properly configured and identified.

When the backup D-Channel is configured, one D-Channel is active and the other one acts as a backup. If the active D-Channel fails, the auto-recovery software will first attempt to recover the primary D-Channel. If the recovery is successful, the D-Channel goes back into operation. However, if this recovery does not take place, software switches the D-Channel messaging to the backup D-Channel on a different PRI link. If the active backup D-Channel fails after the problem with the primary D-Channel has been resolved, the auto recovery software will automatically switch back to the primary D-Channel. During the switchover procedure, established calls will remain intact; transient calls, however, may be dropped.

The Recovery to Prime feature (RCVP) is a service changeable option which, if selected, will automatically changeover to the primary D-Channel whenever the primary D-Channel becomes established due to autorecovery or a maintenance command.

The Backup D-Channel requires a separate NTAK93 daughterboard (DCHI), NTAK09 DTI/PRI card and T1 facility. For dedicated ISL applications, a separate NTAK02 circuit card, modem and NTAK19BA cable are required.

Prior to X11 release 18, the Back-Up D-Channel feature is only supported between Meridian 1/SL-1 systems, and can be configured for either ISL or PRI applications. With X11 release 18 and later software, the backup D-channel provides connections from Meridian 1 to the following systems:

- Meridian 1 - DMS-250 (BCS 32 and later)
- SL-100 - AT&T 4ESS
- DMS-100 - (BCS32 and later)

In X11 release 18 and later, the backup D-channel conforms to the Meridian Customer Defined Networking (MCDN) protocol and AT&T's TR41449 and TR41459.

Package Requirements

The Backup D-Channel feature is part of the basic ISDN option package, the requirements are as follows:

ISDN	option 145
PRI	option 146
ISL	option 147

Basic Call Service

ISDN basic call service transmits the ISDN call and consists of call progress signaling and voice or data transmission.

Three types of numbering plans are supported: Coordinated Dialing Plan (CDP), North American 10-digit numbering plan (E.164), and Uniform Dialing Plan (UDP).

Basic call service is supported for the following switch interfaces:

- Meridian 1 Option 11 to Meridian 1/SL-1
- Meridian 1 Option 11 to Meridian SL-100
- Meridian 1 Option 11 to DMS-100
- Meridian 1 Option 11 to DMS-250
- Meridian 1 Option 11 to DMS Centrex

- Meridian 1 Option 11 to AT&T #4ESS
- Meridian 1 Option 11 to AT&T #5ESS

Call Progress Signaling

PRI supports 64 Kbps out-of-band signaling on the D-Channel for:

- call set-up
- call tear down
- feature activation
- local busy and reorder tones.

Messages to generate local tones are transmitted on the D-Channel. Both out-of-band messages and in-band tones are provided for ringback.

Voice or data transmission

Voice and high speed (64 kbps) data are transmitted on the B-channel and assigned on a per call basis. The following modes of transport are available:

- 56 Kbps circuit switched data transmission
- 64 Kbps circuit switched voice or data transmission

Numbering plans

Three numbering plans are supported:

- Coordinated Dialing Plan (CDP) of 3 to 10 digits
- North American 10-digit numbering plan (E.164)
- Uniform Dialing Plan (UDP) which includes the Electronic Switched Network (ESN) 7-digit private numbering plan with 3-digit NARS location codes.

Typically, the numbering plan for a customer's private network consists of a 3-digit location code, such as the ESN number, and a 4-digit extension. This allows the same extension to be used for private networks and for Direct Inward Dialing (DID) from the public network.

Package Requirements for Basic Call Service

Basic Call Service requires the following:

ISDN	option 145
PRI and/or ISL	option 146 and/or ISL option 147

Call Connection Limitations

The Call Connection Restriction product improvement allows limiting conditions to be placed on call connections across the ISDN. Call configurations which would degrade transmission integrity or network performance are prevented.

The following conditions are placed on network call connections:

- No more than one trunk without disconnect supervision can be used in a call connection. Otherwise, trunk lock-up could occur within the network. (This also applies to call-joined connections. Two call connections cannot be joined if each makes use of a trunk without disconnect supervision.)
- Tandem nodes are limited, to prevent potential transmission problems. The maximum number of tandem nodes to be allowed in a call connection can be set between 0 and 31, by way of service change.
- PSTNs can be limited. If so specified, only a single PSTN is permitted in a call connection; or, an unlimited number of PSTNs can be allowed.
- μ /A-Law conversions are limited, to prevent potential transmission problems. The maximum number of conversions to be allowed in a call connection can be set between 0 and 31, by way of service change.
- Satellite delays are limited. The maximum number of Satellite delays to be allowed in a call connection can be set between 0 and 5, by way of service change.

These call limitations only apply within an ISDN environment. For this product improvement to be effective, ISDN connectivity must be available between the originating and terminating nodes.

With the use of multiple call transfers, conferencing and other manipulations, it is possible to bypass this product improvement's control of the number of unsupervised trunks in a call connection. In these situations, other ISDN call-connection limitations may also be overcome.

The Call Connection Restriction product improvement overrides the Satellite Link Control feature. Whereas the Satellite Link Control feature limited the number of Satellite access lines or intermachine trunks to one, the Call Connection Restriction product improvement allows this limit to be service-changeable.

When calls are joined, it is possible to produce a call connection which violates some of the call-connection restrictions. Under these conditions, it is possible to exceed the limits on tandem nodes, μ /A-Law conversions and network call redirections.

Call Forward All Calls/No Answer

Call Forward All Calls and Call Forward No Answer enable callers to manually forward or forward on a no answer to any other station on the ISDN network. The receiving location is provided with the dialed number, the calling number, and if CPND is optioned, the caller's name plus the reason for the redirection. The caller's display is also updated to show the name and number of the person the call was redirected to plus the reason for the redirection.

This feature is applicable to the following telephones for Name and Number display:

- M2250 Attendant Console
- Meridian Telephones equipped with digit display:
 - M3000 Touchphone
 - M2317
 - M2008
 - M2616
 - M2216

Package Requirements

The package requirements are as follows:

Digit Display	option 19
ISDN	option 145
PRI	option 146 or ISL option 147
Calling Party Name Display	option 95

Call Forward, Break-In and Hunt Internal or External Network Wide

The Call Forward, Break-In and Hunt Internal or External Network Wide feature determines whether a call is treated as internal or external on a network wide basis. A call is treated as internal if it terminates and originates within a private network. A call is treated as external if it terminates or originates outside a private network. These definitions of internal/external call are applied to incoming calls for the Call Forward by Call Type feature and to outgoing calls for the Break-In feature.

A network-wide call receives internal treatment if the Numbering Plan Identifier (NPI) in the Calling Line Identification (CLID) is private. Conversely, if the NPI is not present, the Network Attendant Services (NAS) information will be used if it is configured.

This feature operates using the available information that is associated with a call. This information is decoded to determine different treatments for Break-In Indication, Call Forward/Hunt by Call Type or Internal Call Forward.

If neither the CLID, NAS, or QSIG information is present, the following occurs. The route class mark defined in the route data block will be used to collect information necessary to determine whether a call should be given internal or external treatment. The network wide definition can be superseded by the route class. This can be configured on a route basis by entering “LOC” at the new prompt “IDEF” in the customer data block configuration (LD 15).

With a private network interexchange signaling protocol QSIG, the CLID and NPI are used if they are present. If this information is not present, then the QSIG specific data giving information on the far end of the call is used.

Operating parameters

The only features impacted by this feature are Call Forward/Hunt by Call Type, Internal Call Forward and Attendant Break-In. The Attendant Break-In feature will continue to treat conference calls as external. Network side conference is not considered.

For outgoing calls, this feature functions by the information created from the terminating node back to the originating node.

QSIG calls are treated depending on the equivalent information to the NPI or to NAS type information transported.

Internal Call Forward considers the transferred party and not the transferring party (both attendant and set) when the transferring party is on the treating node. Information transported across the network by NAS or QSIG from a network side transferred call is not considered. The information on the transferring party only will determine the type of treatment given to a call.

Feature interactions

Attendant Break-In

Attendant Break-In Indication and Prevention

Call Forward by Call Type

If the Internal/External definition in LD 15 is set to YES, a call is treated as internal or external on a network wide basis.

Call Forward, Internal

If a treated call is a transfer call and the transferring call is on the treating node, the transferred party will be considered. However, when the transferring party is not on the treating node, the transferring party will determine the treatment given.

Call Transfer**Network Call Transfer****Network Call Redirection**

The treatment of a call following a call transfer (Call Forward/Hunt by Call Type) is based on the transferring set and the call originator's set. The set display on network call modification or redirection does not change.

Network Attendant Service

When a call is transferred, a new facility message is sent to the transferred party's node to transport the terminal indicator parameter or the access trunk information parameter.

QSIG

Call Forward, Break-In and Hunt Internal or External Network Wide uses the NAS equivalent information that is transported on protocols such as Party Category and Progress Indicator for QSIG.

Feature packaging

Call Forward, Break-In and Hunt Internal or External Network Wide is included in base X11 system software.

NAS messaging requires Network Attendant Services (NAS) package 159.

QSIG requires QSIG package 263.

Feature implementation

LD 15 – Define Network Wide definition of Internal/External Calls in Customer Data Block.

Prompt	Response	Description
REQ	CHG	Change.
TYPE	FTR	Customer Features and options.

CUST	0-31	Customer number.
- IDEF	YES	Network-wide internal or external definition for Call Forward/Hunt by Call Type, Internal Call Forward and Break-In Indication Prevention. Calls will be treated as internal or external according to the network-wide definition. NO = call will be treated as internal or external as it was previously programmed.

LD 16 – Modify Route Data Block to Define Internal/External Calls.

Prompt	Response	Description
REQ	CHG	Change.
TYPE	RDB	Route data block.
CUST	0-31	Customer number.
ROUT	0-511	Route number.
...		
RCLS	(EXT), INT	Route Class marked as External or Internal.
IDEF	(NET), LOC	Internal/External Definition. If NET is entered, any call over the selected route will receive network treatment according to available network information. If LOC is entered, the route class of the selected route will supercede any other information. A call over this route will receive internal treatment if the route class is set to internal, otherwise it will receive external.
Note: The prompt IDEF will output only if IDEF = YES in the Customer Data Block. If IDEF = NO, any information that was entered previously at the IDEF prompt will not influence the treatment received by a call.		

Feature operation

No specific operating procedures are required to use this feature.

Call Forward/Hunt Override via Flexible Feature Code

Call Forward Override provides all telephone users (having a specific Class of Service) and attendants with the ability to override Intercept Computer Call Forward (ICP-CFW), Call Forward All Calls, Call Forward No Answer, Hunting and Make Set Busy by entering a Flexible Feature Code. In order to use this feature, the originating set must have Call Forward Hunt Allowed (CFHA) Class of Service. When this feature is enabled if override is attempted, and the called party is idle, the set is rung regardless of any diversion. If the dialed set is busy and has Hunt active, the calling party will terminate on the wanted set and receive a busy indication. Sets without Call Forward/Hunt Override denied (CFHD) Class of Service will not be able to use the Call Forward/Hunt Override (CFHO) Via Flexible Feature Code (FFC) feature.

Call Forward/Hunt Override Via FFC works in network environments with Meridian 1 nodes and Meridian Customer Defined Network (MCDN) links.

Operating parameters

The Call Forward/Hunt Override FFC can only be used in predial mode from a set (i.e., it has to be dialed before dialing the DN that has Call Forward All Calls, Intercept Call Forward, Call Forward No Answer, Internal Call Forward, Hunt, or Make Set Busy active).

The Call Forward/Hunt Override FFC can only be dialed from its own node (i.e., it has to be dialed before any trunk access code).

On an ABCD set the Call Forward/Hunt Override FFC can only be configured as a predial FFC (ABCD sets are a type of German telephone).

Call Forward/Hunt Override FFC can only be used against extensions with one of the following type: HOT/MCN/MCR/SCN/SCR/Basic Rate Interface (BRI) DNs and analog (500/2500 type) sets.

It is not possible for BRI extensions to dial a Call/Forward Hunt Override FFC.

The Call Forward/Hunt Override via FFC feature can only be used in standalone and MCDN environments. If no MCDN links are involved, no information about Call Forward/Hunt Override will be passed on to other nodes.

To get the functionality of Call Forward/Hunt Override Via FFC in an MCDN environment these enhancements must be integrated in the originating node, terminating node and any intermediate nodes.

Feature interactions

Attendant Blocking of DN

Using Call Forward/Hunt Override FFC after activation of ABDN is not allowed. Any attempt will be canceled and overflow tone will be returned.

Automatic Call Distribution (ACD)

ACD DNs are not overridden by Call Forward/Hunt Override Via FFC. Any attempt will be canceled and access denied treatment will be returned. Individual DNs on an ACD set are overridden by Call Forward/Hunt Override Via FFC with the same limitations as for other sets.

Barge-in

Busy Verify

Break-in

Using Call Forward/Hunt Override Via FFC after activation of Barge-in, Busy Verify or Break-in is not allowed. Attempts will be canceled and overflow tone will be returned.

Using post-dial Break-in after dialing the Call Forward/Hunt Override FFC is possible after encountering a busy set, if Break-in is enabled.

Basic Rate Interface (BRI)

BRI sets are not supported; any attempt to dial Call Forward/Hunt Override from a BRI set will be ignored and access denied treatment will be returned.

Boss Secretary Filtering

Call Forward All Calls

Call Forward No Answer

Call Forward and Busy Status
Internal Call Forward/Make Set Busy

These features are overridden by the Call Forward/Hunt Override Via FFC feature, but there are no changes to the features themselves.

Call Transfer

A set can activate Call Forward/Hunt Override Via FFC when initiating a transfer. If the transfer is completed while ringing, the Call Forward/Hunt Override will still be active and passed on to the transferred party.

Call Waiting

Call Waiting can be used even if the Call Forward/Hunt Override Via FFC feature has been activated. When a busy set with Call Waiting configured is encountered, it will terminate on Call Waiting.

Call Waiting Redirection

There is no interaction with the Call Waiting treatment component of the Call Waiting Redirection feature. However, Call Forward/Hunt Override via Flexible Feature Code does override CFNA, and thus the CFNA treatment given to unanswered Call Waiting calls by the Call Waiting Redirection feature is overridden by the CFHO feature. The incoming call will continue to be given Call Waiting treatment as if the Call Waiting Redirection feature is disabled when the CFHO feature is enabled by the calling party.

Camp-on

When a busy set is encountered, it is possible to Camp-on to the set, even if Call Forward/Hunt Override Via FFC has been activated.

Direct Inward System Access (DISA)

DISA is not supported. Any attempt to dial the Call Forward/Hunt Override FFC will be ignored and access denied treatment will be returned.

Do Not Disturb (DND)

This feature is not overridden by the Call Forward/Hunt Override Via FFC feature.

Flexible DN (FDN)

External Flexible DN (EFD)

It is not possible to store the Call Forward/Hunt Override FFC as an FDN or EFD.

Group Call

It is not possible to use the Call Forward/Hunt Override FFC as a Group Call DN.

Group Hunt

Primary Line Directory Numbers (PLDNs) are not overridden by the Call Forward/Hunt Override Via FFC feature. Any attempt will be ignored and access denied treatment will result.

Hunt

This feature is overridden by the Call Forward/Hunt Override Via FFC feature. If a set activating Call Forward/Hunt Override Via FFC encounters a busy set no hunt steps will be performed; the call will terminate on the DN and busy tone will be returned.

Hunt DN/External Hunt (EHT) DN

It is not possible to store the Call Forward/Hunt Override FFC as a Hunt or EHT DN.

Idle Extension Notification (IEN)

This feature can be used even if the Call Forward/Hunt Override Via FFC feature is activated. When a busy set is encountered, it is possible to place an IEN request against the set.

Intercept Computer (ICP) Call Forward

This feature is overridden by the Call Forward/Hunt Override Via FFC feature. The Call Forward/Hunt Override FFC replaces the ICP Override FFC.

Last Number Redial

The Call Forward/Hunt Override FFC and the dialed DN are stored under Last Number Redial.

**Multiple Appearance Multiple Call Arrangements (MCAs)
Multiple Appearance Single Call Arrangements (SCAs)**

If the Call Forward/Hunt Override FFC is used against an MCA (MCR/MCN) or SCA (SCR/SCN) DN it will override any active forward and terminate on all idle appearances. If all appearances are busy, busy treatment will be returned.

Primary Line Directory Number (PLDN)

It is not possible to store the Call Forward/Hunt Override FFC as a PLDN.

Phantom DN

This feature is not overridden by the Call Forward/Hunt Override Via FFC feature. If Call Forward/Hunt Override Via FFC is used against a phantom TN the call will be canceled and overflow tone will be given.

Phantom TN

This feature is not overridden by the Call Forward/Hunt Override FFC. If a Call Forward/Hunt Override FFC is used against a Phantom TN, the call will be canceled and overflow will be given.

Priority Override

It is possible to use Priority Override after using the Call Forward/Hunt Override FFC and encountering a busy set.

Radio Paging

If Radio Paging is activated in a call where Call Forward/Hunt Override has been used, the Call Forward/Hunt Override feature will be deactivated.

**Ring Again
Network Ring Again**

Using the Ring Again feature is possible after using the Call Forward/Hunt Override FFC and encountering a busy signal. Ring Again can be placed against the set for which the Call Forward/Hunt Override FFC was used (i.e., the set with CFW active should be rung by the Ring Again feature).

Ring Again No Answer

Network Ring Again No Answer

Using the Ring Again No Answer feature is possible after using the Call Forward/Hunt Override FFC and encountering an idle set that does not answer. Ring Again No Answer can be placed against the set for which the Call Forward/Hunt Override FFC was used (i.e., the set should be rung by the Ring Again No Answer feature).

Single Digit Access (SDA)

It is not possible to store Call Forward/Hunt Override FFCs in an SDA list.

Semi-automatic Camp-on (SACP)

This feature can be used even if the Call Forward/Hunt Override Via FFC feature is activated. When encountering a busy set, it is possible to activate SACP, if it is applicable.

Speed Call

The Call Forward/Hunt Override FFC cannot be stored in a speed call list.

Feature packaging

In a standalone environment the Flexible Feature Codes (FFC) software package 139 must be provisioned to activate this feature.

For network environments, Network Attendant Service (NAS) package 159 must also be provisioned. Attendant Overflow Position (AOP) package 56 must be restricted, as it is mutually exclusive with Network Attendant Service.

Feature implementation**LD 57 – Define FFC for Call Forward/Hunt Override.**

Prompt	Response	Description
REQ	NEW, CHG	New, or change.
TYPE	FFC	Flexible Feature Code.
...		
CODE	CFHO	Call Forward/Hunt Override Via FFC.
CFHO	nnnn	Call Forward/Hunt Override FFC.

LD 10 – Set Class of Service for the Forward/Hunt Override Via FFC feature for analog (500/2500 type) sets.

Prompt	Response	Description
REQ	NEW, CHG	New, or change.
TYPE	500	Type of telephone set.
...		
CLS	(CFHD), CFHA	Call Forward/Hunt Override Via FFC is (denied) or allowed.

LD 11 – Set Class of Service for the Forward/Hunt Override Via FFC feature for Meridian 1 proprietary sets.

Prompt	Response	Description
REQ	NEW, CHG	New, or change.
TYPE	xxxx	Type of telephone set.
...		
CLS	(CFHD), CFHA	Call Forward/Hunt Override Via FFC is (denied) or allowed.

LD 18 – Configure ABCD key for the Forward/Hunt Override Via FFC feature.

Prompt	Response	Description
REQ	NEW, CHG	New, or change.
TYPE	ABCD	Modifying 16-button DTMF.
...		
PRED	YES	Function table for pre-dial.
A	CFHO*FFC*	CFHO is assigned to key A.
B	CFHO*FFC*	CFHO is assigned to key B.
C	CFHO*FFC*	CFHO is assigned to key C.
D	CFHO*FFC*	CFHO is assigned to key D.

Feature operation

The user gets the same functionality in a Meridian Customer Defined Network (MCDN) as in standalone environments. The Call Forward/Hunt Override information is transmitted from the originating node to the terminating node using the Network Attendant Service (NAS) feature.

Activation of the service is call dependent; network-wide Call Forward/Hunt Override is part of the NAS feature.

To activate the Call Forward/Hunt Override feature, the user dials the FFC for Call Forward/Hunt Override and the DN of the wanted party. If the set is idle, the set is rung regardless of any diversion (e.g., Call Forward All Calls, Intercept Call Forward, Call Forward No Answer, or Hunt) or Make Set Busy on the set.

If the set(s) have displays, the display(s) are updated. If the display on the originating set is updated when the call is answered, the Call Forward/Hunt Override FFC will no longer be displayed.

If the dialed set is busy and Hunt is active, the calling party will terminate on the wanted set and will receive busy indication.

If the dialed set is idle, but does not answer within the defined number of ringing cycles for CFNA, the call is not forwarded (i.e., it continues to ring).

If the dialed set is busy, the attendant can activate Camp-on, if Camp-on is applicable. In addition, Ring Again can be placed against a set for which Call Forward/Hunt Override was used and a busy set was encountered.

Call Page Network Wide

Prior to X11 Release 22, call paging was only accessible if both the attendant or user and the paging trunk route were located on the same node. The Call Page Network Wide (PAGENET) feature expands call paging capabilities by allowing an attendant or user to access a paging trunk route located on a different node.

The PAGENET feature controls external paging access privileges with the following levels of access: Restricted, Controlled and Uncontrolled. On the paging trunk, trunks are assigned a level of access on a trunk route basis. On other network nodes, access privileges can be assigned to attendant consoles and sets.

If the paging trunk route at the paging node is configured as PAGENET Restricted, all external users are prevented from accessing the paging trunk route. Access attempts from an external location are given a defined intercept treatment by the paging node.

PAGENET Controlled allows limited access to external users meeting the following criteria:

- the attendant console or set is programmed with PAGENET allowed in the Class of Service;
- the point-to-point D-channel is configured with remote capability (e.g RCAP=NAC).

With PAGENET Uncontrolled, all external users can access the paging route provided that the call paging request to the paging node is incoming via a TIE or a VNS Bearer trunk.

When the call paging request has been accepted and established by the paging node, the originator does not receive any special indication when the call is connected to the paging trunk.

Operating parameters

If the NTA02BB SDI/DCH circuit card is used on systems with a software vintage earlier than Generic X11 Release 21.40, it must be ensured that the power is removed from the card before it is used for the operation of Call Page Network Wide. This will normally take place during software upgrade; otherwise, the card must be removed and the power must be reset.

To support Call Page Network Wide within a dedicated ISL/VNS configuration, a NTA02 (minimum vintage **BB**) DCH circuit card must be used.

Call Page Network Wide will only be supported on the NTA51BA D-Channel Daughterboard, for D-channel handling with PRA.

A user may experience a delay between the time of dialing the last digit and the actual call termination. The Call Page Network Wide feature does not change this operation. Therefore, with external paging calls the user may not realize when a connection is actually established unless the paging equipment provides audible notification.

External PAGENET uncontrolled calls are supported on Integrated Services Digital Network (ISDN) and non-ISDN networks provided that the incoming trunk into the Paging node is a TIE Trunk.

External PAGENET Controlled is only supported on Virtual Network Services (VNS) and ISDN networks, provided that the caller is using an Attendant Console or PAGENET allowed set and the point-to-point D-channel connection between the nodes has remote capability of network access (e.g. RCAP = NAC).

Feature interactions**Attendant Barge-In****Attendant Break-In**

For external PAGENET uncontrolled calls, Attendant Barge-In is blocked at the Paging node, per existing operation. For external PAGENET controlled calls, Attendant Barge In is blocked at both the originating and Paging node.

Attendant Call Extension

If an attendant's source (SRC) or destination (DEST) Key is connected to an external PAGENET uncontrolled trunk, Attendant Call Extension is not blocked. However, if an attendant's SRC or DEST Key is connected to an external PAGENET controlled route, Attendant Call Extension is blocked.

Call Forward All Calls**Call Forward No Answer****Hunt**

PAGENET does not block a station set from being programmed to Call Forward All Calls, Call Forward No Answer or Hunt to an external Paging trunk. At call termination time, calls that are forwarded to an external PAGENET uncontrolled trunk are not blocked. However, calls forwarded to an external PAGENET controlled trunk are given access denied intercept treatment at the Paging node.

Call Park**Call Transfer****Conference****No Hold Conference**

A station set or Attendant Console that parks, transfers or conferences an external PAGENET uncontrolled call is not blocked. However, an external PAGENET controlled call is blocked.

Originator Routing Control/Remote Virtual Queuing

This is supported for an incoming call to a Paging trunk when all the trunk members of the dialed Paging route are busy.

Feature packaging

Call Page Network Wide (PAGENET) requires package 307.

Feature implementation

LD 16 – Configuring Paging Route.

Prompt	Response	Description
REQ	NEW	New.
TYPE	RDB	Route data block.
CUST	0-31	Customer Number associated with route.
...		
TKTP	PAG	Paging Route.
NACC	(PGNR)	Call Page Network Wide Restricted (default). PGNC = Call Page Network Wide controlled (ISDN only) PGNU = Call Page Network Wide uncontrolled (PGNU is equivalent to ISDN/Analog media.)
ICOG	OGT	Outgoing trunk.
TARG	1-15	Trunk Access Restriction Group.

LD 14 – Paging Trunk Configuration.

Prompt	Response	Description
REQ	NEW	New.
TYPE	PAG	Trunk type.
TN	c u	Terminal number.
RTMB	0 - 511 1- 254	Route number, Member number.

LD 10 – Assign Class of Service to Analog (500/2500 type) telephones.

Prompt	Response	Description
REQ	NEW, CHG	New, or Change.
TYPE	500	Type telephone.
...		
CLS	PGNA	Call Page Network Wide Allowed. (PGND) = Call Page Network Wide Denied (default).

LD 11 – Assign Class of Service to Meridian 1 Proprietary Telephones.

Prompt	Response	Description
REQ	NEW, CHG	New, or Change.
TYPE	xxxx	Telephone type, where xxxx= SL1, 2006, 2008, 2009, 2016, 2018, 2112, 2216, 2317, 2616, or 3000.
...		
CLS	PGNA	Call Page Network Wide Allowed. (PGND) = Call Page Network Wide Denied (default).

LD 27 – Assign Class of Service to ISDN BRI sets.

Prompt	Response	Description
REQ	NEW, CHG	New, or Change.
TYPE	DSL	Type of data block.
DSL	l s c dsl	Digital Subscriber Loop address.
CLS	PGNA	Call Page Network Wide Allowed. (PGND) = Call Page Network Wide Denied (default).

LD 17 – D-channel Message Configuration.

Prompt	Response	Description
REQ	CHG	Change.
TYPE	ADAN	Input or Output Devices.
ADAN	CHG DCH x	Change D-channel.
- CTYP	MSDL DCHI	The NTBK51BA D-Channel Daughterboard for PRA. NTBK51BA D-Channel Daughterboard for ISL/VNS.
RCAP	NAC	Remote capability where: NAC= Class of Service data. XNAC = removes Class of Service as a remote capability (default).

Feature operation**Internal Paging Call**

No specific operating procedures are required to use this feature.

External Paging Call

When a user makes an external Paging call via dial access, one of the following dialing plans must be used:

- 1 Route Access Code (ACOD) that connects user to Paging node and Paging route ACOD;
- 2 BARS/NARS; or
Coordinated Dialing Plan.

Call Park Network Wide

Prior to X11 Release 22, a call in a parked state on a System Park Directory Number (DN) or station set park DN could only be retrieved by an attendant console or a station set located within the same node. The Call Park Network Wide (CPRKNET) feature builds on the existing functionality of Call Park and introduces the following capabilities: Network Call Park, Call Park Expansion and External Call Park Access.

Network Call Park enables an attendant or a station set to park a call on System DN or DN within a Meridian Customer Defined Network (MCDN). This networking capability requires users at parking, parked at, tandem and accessing nodes be equipped with Network Attendant Services (NAS). The parking node refers to the location of the attendant or station set parking the call, the parked at node is the location of the parked call, the tandem node is the routing bridge for the parked call and the accessing node is the location of the user retrieving the parked call.

Call Park Expansion increases the amount of Call Park blocks and number of System Park DNs. With CPRKNET configured, a user can define up to five different Call Park blocks. Each call park block can be separately configured with programmable parameters (such as recall timers). The maximum recall timer is expanded from 240 to 480 seconds and the maximum number of System Park DNs in each block is increased from 50 to 100 directory numbers.

External Call Park Access permits an external caller to retrieve a call in parked stated through either a Direct Inward Dial (DID) trunk or a TIE trunk. The external user must initially be informed that a call has been parked. The external party is informed and can only retrieve the parked call if they know the accessing DN. It is important to note that if a system administrator utilizes the enhancements offered by Call Park Expansion and configures five call park blocks then these System Park DN ranges must be known by all users attempting to access this feature.

Operating parameters

The existing Call Park feature packaging is expanded in X11 Release 22. With Release 22, recall timer and number of System Park DNs expansions are included in base system software. However, the new CPRKNET package is required to access the multiple call park blocks and networking capabilities.

Network Call Park does not support Centralized Attendant Service.

The existing Trunk Barring feature ensures that only an appropriate incoming trunk can be connected to a parked party.

The existing Trunk Group Access Restriction (TGAR) feature checks the incoming accessing trunk. A parked call can only be retrieved if the TGAR and Trunk Access Restriction Group (TARG) of the trunks correctly match.

Call Park Expansion

The Primary Call Park Block must be defined for the customer.

Network Call Park

Network Call Park is supported if the network has all nodes connected by MCDN ISDN links with NAS signaling configured. All the current limitations of the NAS feature apply to CPRKNET.

The CPRKNET package must be enabled on both the parking and parked nodes. The package is not required on the tandem node.

The parking node and the parked at node must have a Primary Call Park Block defined.

When the call park recall timer expires on a parked call at another node, the call recalls to the attendant at the parking node regardless of the configuration of the recall park call to attendant (RECA) timer of the associated call park block. This recall to an attendant occurs even if the call was parked by a station set.

A remotely parked call recalls to an attendant, or Network Attendant if configured, at the parking node when the timer expires. This recall to the attendant occurs even if the parking party is a station set.

Parked Call External Access

Only a call that is parked on a System Park DN can be retrieved by an incoming trunk. A call parked on a station DN cannot be retrieved by an external caller.

Only incoming Direct Inward Dial (DID) or TIE trunks can retrieve a parked call.

A user does not receive any special indications when retrieving a parked call. The user is connected to the parked call immediately.

Feature interactions**Answer Supervision**

If a parked call is connected to an incoming trunk with Answer Supervision, the appropriate messages on the status of the call are sent through the incoming trunk to the far end.

Basic Alternate Route Selection**Network Alternate Route Selection**

An Electronic Switched Network (ESN) number can be assigned as the System Park or Station Set DN to a Network Call Park call. A parked call on a System Park DN can be retrieved by a caller outside the parked node via BARS/NARS dialing.

Camp-On

When an attendant attempts to extend a call to a busy station across the network and the busy station returns a Camp-On allow signal, an attendant has the option of camping on a call or continuing with Network Call Park.

Coordinated Dialing Plan

A Coordinated Dialing Plan number can be assigned to a Network Call Park call that the attendant or station set is attempting to park.

Trunk Anti-Tromboning

The Trunk Anti-Tromboning feature is invoked if programmed at all interim Private Branch Exchanges (PBXs) in the call.

Recall to Same Attendant, Network Wide

Network Call Park supports this feature. However, all limitations and restrictions associated with Network Wide Recall to Same Attendant are applicable.

Feature packaging

The Network Call Park and External Call Park Access capabilities of the Call Park Network Wide (CPRKNET) requires package 306 and Network Attendant Services (NAS) package 159. With Release 22, expansions to the recall timer and the number of System Park DNs are included in Call Park (CPRK) package 33.

Feature implementation

LD 15 – Enable Call Park Network Wide.

Prompt	Response	Description
REQ	CHG	Change.
TYPE	FTR	Customer Features and options.
CUST	0-31	Customer number.
- OPT	CPN	Enable Call Park Network Wide. CPA = Enables Call Park. CPD = Disables Call Park (default).

LD 50 – Add/Change Customer Call Park Data.

Prompt	Response	Description
REQ	NEW, CHG	New, or change.
TYPE	CPK	Call Park data block.
CUST	0-31	Customer number.
BLOC	1-5	Call Park data block number. Primary Call Park (block 1) must be defined for Call Park operation. Block 1 must be initially defined before attempting to remove.
CPTM	30-(45)-480	Call Park Timer (in seconds).
RECA	(NO), YES	Call Park Recall to Attendant.
SPDN	(0)-100 xx...x	Number of contiguous system park DNs and first DN of that range.
MURT	0-511	Music Route number for parked call.

LD 10 – Enable Call Park for Analog (500/2500 type) telephones.

Prompt	Response	Description
REQ	NEW, CHG	New, or Change.
TYPE	500	Telephone type.
TN	c u	Terminal Number.
CLS	XFA	Call Transfer Allowed. XFD = Call Transfer Denied.

LD 11 – Add/Change Call Park Key on Meridian 1 proprietary telephones.

Prompt	Response	Description
REQ	NEW, CHG	New, or Change.
TYPE	xxxx	Telephone type where: aaaa = SL1, 2006, 2008, 2009, 2016, 2018, 2112, 2216, 2317, 2616 or 3000.
TN	c u	Terminal Number.
KEY	xx PRK xx TRN xx AO3 xxAO6	Key assignment for Call Park. Key number, Transfer. Three Party Conference. Six Party Conference.

LD 12 – Add/Change Call Park Key on Attendant Consoles.

Prompt	Response	Description
REQ	NEW, CHG	New, or Change.
TYPE	xxxx	Console type.
TN	c u	Terminal Number
KEY	xx PRK	Key number, Call Park.

LD 17 – D-channel Message Configuration.

Prompt	Response	Description
REQ	CHG	Change.
TYPE	ADAN	Input or Output Devices.
ADAN	CHG DCH x	Change D-channel.
...		
RCAP	CPK	Remote capability, where CPK = Network Call Park enabled. XCPK = removes Network Call Park.
...		

Feature operation

Call Park Expansion

Attendant Console with Park Key

Attendant Console via Dial Access

Meridian 1 Proprietary Set with Display and Park Key

- 1 Press PRK key, or dial SPRE + 71 or Call Park FFC.
- 2 An available System Park DN is displayed. To override this DN, dial another Park DN.
 - If number dialed is an available Park DN, the digit display is cleared and only the dialed Park DN is displayed (without SPRE + 71 or CPRK FFC).
 - If number dialed is invalid or unavailable station Park DN an overflow tone is heard.
 - If number dialed is an unavailable System Park DN, overflow tone is heard. If another System Park DN is available in the Call Park Block, the system assigns this DN. The available System Park DN is displayed and silence is returned.
- 3 Press PRK key or if using SPRE or FFC press Release RLS key to complete call park.

Meridian 1 Proprietary Set with Display via Dial Access

- 1 Press the CONF or TRN key.
- 2 Dial SPRE + 71 or CPRK FFC.

- 3 An available Primary System Park DN is displayed. To override this DN dial another Park DN.
 - If number dialed is available, digit display is cleared and dialed Park Access ID is displayed (without SPRE + 71 or CPRK FFC).
 - If number dialed is an invalid System Park DN or an unavailable station park DN, overflow tone is heard.
 - If number dialed is an unavailable System Park DN, but another available System Park DN exists in the Call Park Block, the available System Park DN is displayed. Silence is returned.
- 4 Press the CONF or TRN key to complete call park.

***Meridian 1 Proprietary without Display
Analog (500/2500) type telephones***

The Call Park operation on these types of telephones is not affected.

Network Call Park

The existing Call Park operation is modified to accommodate the Network Call Park capabilities of the CPRKNET feature. A user must enter a Park DN that is either a Station Park DN or a System Park DN that is located at another node, within the attendant's or station set's MCDN network.

***Attendant Console
Meridian 1 Proprietary Set with Display with Park Key
Attendant Console via Dial Access***

- 1 Press the PRK key or dial SPRE + 71 or CPRK FFC.
- 2 An available Primary System Park DN from parking node is assigned and displayed.
- 3 To override the displayed System Park DN with another Park DN, dial the ESN number and remaining digits.
 - At the remote node, if there is an available Park DN, silence is heard. The digit display of the set is cleared and the dialed Park DN is displayed without the SPRE + 71 or CPRK FFC.
 - At the remote node, if numbers dialed are invalid or unavailable, overflow tone is heard.

- At the remote node, if the numbers dialed are an unavailable System Park DN but another System Park DN is available in the Call Park Block, the system assigns this DN. The available System Park DN is displayed and silence is returned. If no DN is available and there is no other available DN in the Call Park Block, overflow tone is heard.
- 4 If using an Attendant Console, press the RLS key, or if using Meridian 1 Proprietary Set with Display, press the PRK key to complete call park.

Attendant Parking an Extended Call

- 1 Press the PRK key.
- 2 Extended party is released and ringback or busy tone is removed. SPRE + 71 + ESN number of the extended call are displayed.
 - At the remote node, if there is an available Park Access ID, silence is heard.
 - At the remote node, if numbers dialed are an invalid or unavailable Park DN, overflow tone is heard.
- 3 Press the RLS key to complete call park.

Meridian 1 Proprietary Set with Display via Dial Access

- 1 Press the CONF or TRN key.
- 2 Dial SPRE + 71 or CPRK FFC.
- 3 An available Primary System Park DN from the parking node is displayed.
- 4 To override this with another Park DN, dial the ESN number and digits.
 - At the remote node, if there is an available Park Access ID silence is heard. The digit display is cleared and the dialed Park Access ID is displayed without the SPRE + 71 or CPRK FFC.
 - At the remote node, if the ESN number is an invalid or unavailable Park DN, overflow tone is heard.
 - At the remote node, if dialed System Park DN is not available but there is another available System Park DN in its Call Park Block, the available System Park DN is displayed. Silence is returned.
- 5 Press CONF or TRN key to complete call park.

***Meridian 1 Proprietary Set without Display with PRK key
Meridian 1 Proprietary Set without Display via Dial Access
Analog (500/2500 type) set***

- 1 Press the PRK, CONF, TRN or perform switchhook flash depending on type of set and key assignment.
- 2 Dial SPRE + 71 or CPRK FFC.
- 3 Dial the ESN Number and digits.
 - At the remote node, if there is an available Park DN, silence is heard.
 - At the remote node, if numbers dialed are invalid or unavailable, overflow tone is heard;
- 4 Press same key in Step 1 or go on-hook to complete call park.

Canceling Call Park Network Wide during operation

The procedure for canceling the Call Park Network Wide feature follows the existing operation of canceling Call Park. However, once an overflow tone is heard, the attendant or station set must cancel the Call Park attempt and restart the Call Park process. The operation of canceling Call Park on different terminals is described below.

Attendant Console

Press the RLS DEST Key. Call Park is canceled and the original call is reconnected to the attendant console.

Meridian 1 Proprietary Set

Press the flashing DN Key. Call Park is canceled and the original call is reconnected to the attendant console or the station set.

Analog (500/2500 type) Set

Complete a switchhook flash. Call Park is canceled and the original call is reconnected to the attendant console or the station set.

External Call Park Access

External Call Park Access allows a parked call on a System Park DN to be retrieved by an external user via an incoming DID or TIE trunk. This capability requires that the node where the call is parked (parked at node) is equipped with the CPRKNET feature and the Primary Call Park Block is defined. To enable external access capabilities, calls must be parked against a System Park DN.

- 1 Call Parked.
- 2 External access caller must be notified or know where the parked call is located.
- 3 Depending on specific dialing plan configuration, the external access caller must dial one of the following to access the call in parked state:
 - for Coordinated Dialing Plan, dial System Park DN;
 - for ESN, dial Access Code + Location Code + System Park DN;
 - for DID, dial area code + Local Exchange + System Park DN; or
 - for DISA, dial DISA number + (Authorization Code + DISA Security Code) + System Park DN.

Call Pick-Up

If an incoming ISDN call is answered using the Call Pick-Up Feature, the displays for the originating and terminating sets will be updated to indicate the correct connected party as well as the reason for redirection.

Call Pickup Network Wide

The Call Pickup Network Wide feature enables the following functionalities to be extended over a Meridian Customer Defined Network ISDN network:

- Ringing Number Pickup
- Directed Call Pickup by Group Number

- Directed Call Pickup by DN, and
- Display Call Pickup.

With the exception of Display Call Pickup, user operation of the above features remains unchanged. To display Call Pickup, press the Display key, followed by the Call Pickup key. Display Call Pickup is modified so that the Ringing Number Pickup (RNP) key winks for five seconds once a local or remote ringing DN is found and displayed. During this time, the user can press the RNP key to initiate a Call Pickup directed to the displayed DN.

With Call Pickup Network Wide, users must be assigned to the same Call Pickup group regardless of network location. Each Ringing Number Pickup Group may be linked to a Speed Call List (SCL) which is used when there is not an applicable local set to pick up. Different groups may be linked to different SCLs.

To be able to route calls through the network from one originating node to a destination node, an ISDN Private Integrated Services Network Exchange (PINX) DN is defined for each node in the network. The ISDN PINX DN is a DN taken from the customer's numbering plan used to aid with the routing of network calls. It does not correspond to a real terminal on the node, so can never be busy. Each SCL contains a list of PINX DNs which correspond to the remote nodes or customers to be searched. Thus, the purpose of the Speed Call List is to let the system know where to look in the network to pick up the call. If a pickup group is linked to a Speed Call List, this group is considered as being network wide.

The search is conducted in an ascending order as programmed in the Speed Call List (i.e., entry 0 first). This Speed Call list is used when there is not an applicable local set to pick up.

When a network search is performed, a slight delay occurs before a call is connected or rejected, during which time the set will receive silence. This delay is traffic dependent. If for any reason the call cannot be rerouted to the requesting party, the call will ring again at the originally dialed DN and the requesting party will receive overflow tone.

Operating parameters

Call Pickup Network Wide is not supported over a Virtual Network Services (VNS) link.

A Speed Call List must be configured with the PINX DN of the remote switch. The local PINX DN must be configured in the Customer Data Block (LD15).

If on one single node two calls are ringing at the same time, the call with the higher priority will be picked up. But if on two nodes two calls are ringing at the same time (one call on each node), the call on the node searched first will be picked up (i.e., a normal ringing call on the local node is picked up before a priority ringing set on a remote node).

Feature interactions

Access Restrictions

All access restrictions applicable to Network Alternate Route Selection (NARS)/Basic Alternate Route Selection (BARS) calls (including Class of Service, Network Class of Service, Trunk Barring (TBAR), and New Flexible Code Restriction (NFCR) restrictions based on digit manipulation) apply to a redirected call from the receiving node to the requesting node. This means that there are no limitations added to the access restriction checks for calls being redirected by the Call Pickup Network Wide feature.

If the call is blocked because of any of these access restrictions on either the receiving, tandeming, or requesting node, the originally called party is re-rung and the party attempting to pick up the call receives overflow tone.

Attendant-Extended Calls

The Call Pickup Network Wide feature can be used to pick up attendant-extended calls to a remote station.

Automatic Call Distribution (ACD)

The Call Pickup Network Wide feature cannot be used to pick up a call to an ACD DN. Calls to ACD DNs will be skipped and queue scanning will search for another ringing call.

A call to a non ACD DN on an ACD set can be picked up as a normal call. A call transferred by an ACD agent can be picked up as a call transferred by a normal set. In addition, it is possible to pick up as a normal call a call originated by an ACD set on a non ACD DN key.

ISDN Basic Rate Interface (BRI)

An ISDN BRI terminal cannot initiate a call pickup, and a call ringing at an ISDN BRI terminal cannot be picked up.

Call Back Queuing

A call redirected by the Call Pickup Network Wide feature cannot be subject to Call Back Queuing.

Call Collision (Glare)

A call redirected by the Call Pickup Network Wide feature will be treated as for normal ISDN calls. A new trunk will be found if possible; otherwise, the requesting party will receive overflow tone.

Call Park

The Call Pickup Network Wide feature cannot be used to pick up parked calls. A recall of a parked call can be picked up, in which case the call is unparked and answered by the requesting party.

Called Party Name Display

Network Call Party Name Display information will be exchanged during Call Pickup Network Wide calls if the sets involved in the call would normally exchange the information for calls over the routes that have been used for the original call and the call pickup. Conversely, if Network Called Party Name Display would not operate for a normal call from the originating party to the terminating party, the service will not be supported when Call Pickup Network Wide is involved.

Name displayed on the requesting party

If a remote ringing station is picked up, the originating party's name is always displayed, independent of the requesting party's Class of Service.

Call Redirection

Network Call Redirection

Call redirection only has an interaction if the call being picked up has already been redirected. In this case, the original redirecting number will be passed on instead of the DN of the set from which the call is being picked up. The redirection reason displayed will remain as the previous displayed redirection reason if the Called Party Name Display is involved.

Call Transfer

Network Call Transfer

A call may be picked up before or after the transferring party has completed the transfer.

For pickup before transfer completion, the transferring party is displayed updated information by the Call Pickup Network Wide feature when the call is picked up. Then, when the transfer is completed, normal call transfer information is exchanged by each party involved in the final call.

For pickup after call transfer completion, everything happens as if the call had been made directly from calling to ringing party. After pickup is performed, displays are updated as for normal Call Pickup.

Call Waiting

Call Waiting calls cannot be picked up.

Call Waiting Redirection

A call that is redirected by the Call Waiting Redirection feature to the active set's Call Forward No Answer DN may be picked up.

Conference

Call Pickup Network Wide may be used to pickup an enquiry call from a conference, subject to the same limitations as apply to Call Transfer.

Data Calls

The Call Pickup Network Wide feature cannot be used to pick up data calls.

Dial Intercom

The Dial Intercom feature is not supported network wide. Any pickup attempt from a distant node to a local intercom call will be rejected, because the far-end user is considered as not being in the same intercom group.

Group Call

The Group Call feature does not allow having a remote party in a Group Call list. Therefore, a Group Call cannot be picked up by a remote station. If during the network scanning a Group Call is found, it will be ignored and the network scanning will continue.

Multi-Tenant Service

The Call Pickup Network Wide is not supported in a multi-tenant environment.

Network HOT Type D Intercom

It is not possible to pick up a HOT type I call; however, it is possible to pick up a HOT type D call.

Network Routing Restrictions**NARS Anti-Tromboning**

At the receiving node where the set is ringing, NARS Anti-Tromboning does not apply to a call being redirected by the Call Pickup Network Wide feature.

Network Attendant Service/ISDN Call Connection Limitations

ISDN Call Connection Limitations (ICCL) apply to Call Pickup Network Wide calls. If the call being redirected by the Call Pickup Network Wide feature is blocked due to one of the ICCL limitations (e.g., Tandem Threshold, Call Redirection Threshold, Number of MU/A Law Conversions, Disconnect Supervision), the originating call will re-ring the originally called party and overflow tone is given to the requesting party.

Night DN

The Call Pickup Network Wide feature can be used to pick up a call to the night number if it is ringing an ordinary station (i.e., analog (500/2500 type) telephone, 16-button Dual-tone Multifrequency, or proprietary set).

Off-Hook Queuing

A call redirected by the Call Pickup Network Wide feature cannot be the subject of Off-Hook Queuing.

Path Optimization

Network Attendant Services (NAS)

NAS Anti-Tromboning is supported by the Call Pickup Network Wide feature.

Trunk Route Optimization Before Answer

The Call Pickup Network Wide feature does not support Trunk Route Optimization Before Answer.

Secondary DN

For calls to, from, or picked up from a secondary DN, all line IDs displayed after a successful pickup will follow the current rules for Calling Line ID and Connected Number. The exception is for Display Call Pickup; if the call is ringing at a secondary DN, the line ID on the requesting user's display will be the ringing DN (that is, the secondary DN). Once the pickup is completed, the displays will be as for normal pickup.

Vacant Number Routing

The Call Pickup Network Wide feature fully supports Vacant Number Routing (VNR) if the route or the set of routes given by the customer for VNR contains at least one MCDN link.

Virtual Network Services

The Call Pickup Network Wide feature will not work in conjunction with the Virtual Network Services feature.

Feature packaging

The Call Pickup Network Wide feature is included in Integrated Services Digital Network (ISDN) package 145.

The following packages must also be provisioned to activate this feature:

- Directed Call Pickup (DCP) package 115
- Advanced ISDN Network Services (NTWK) package 148, and
- 1.5 Mbps PRA package 146

Feature implementation

Note: minimum software vintage of Generic X11 Release 21 in order for Call Pickup Network Wide to be functional. The software Release ID is defined in LD 17.

LD 10 – Assign a Ringing Pickup Group number to an analog (500/2500 type) telephone, and define with the Class of Service which of the Call Pickup features are allowed to be activated from this station.

Prompt	Response	Description
REQ	CHG	Change.
TYPE	500	Telephone type.
TN	c u	Terminal Number.
...		
RNPG	(0)-4095	Ringing Number Pickup Group (RNPG). If the RNPG is set to 0 (the default) on a station, it is not possible to pick up any call ringing this station from any other set. Enter 0 to remove a station from the RNPG. Note: If the RPNG is two or more digits in length, it must be configured in the Customer Data Block (LD 15), so that it may use the Group Pickup key. See the procedure which follows LD 11.
...		
CLS	(PUD), PUA	Ringing Number Pickup (denied) allowed.
	(DPUD), DPUA	DN pickup (denied) allowed.
	(GPUD), GPUA	Group pickup (denied) allowed.

LD 11 – Assign a pickup group to a Meridian 1 proprietary telephone. Define with the Class of Service which of the Call Pickup features are allowed to be activated from this station.

The configuring of different pickup keys is optional, since the Call Pickup and Directed Call Pickup features can be activated by dialing the SPRE + xx or by dialing a Flexible Feature Code. The Digit Display key is needed for the Display Call Pickup feature.

Prompt	Response	Description
REQ	CHG	Change.
TYPE	aaaa	Telephone type, where: aaaa = SL1, 2006, 2008, 2009, 2016, 2018, 2112, 2216, 2317, 2616, and 3000.
TN	c u	Terminal Number.
...		
RNPG	(0)-4095	Ringing Number Pickup Group (RNPG). If the RNPG is set to 0 (the default) on a station, it is not possible to pick up any call ringing this station from any other set. Enter 0 to remove a station from the RNPG. Note: If the RPNG is two or more digits in length, it must be configured in the Customer Data Block (LD 15), so that it may use the Group Pickup key. See the procedure which follows.
...		
CLS	(PUD), PUA (DPUD), DPUA (GPUD), GPUA	Ringing Number Pickup (denied) allowed. DN pickup (denied) allowed. Group pickup (denied) allowed.
...		
KEY	xx RNP yyyy	Key number, Ringing Number Pickup, Pickup Group number (optional). If the Group number is not entered, the key will pick up calls in the group assigned to the station. If the Group number is entered, the key will pick up calls in the specified group yyyy.

KEY	xx GPU	Key number, Group Number Pickup.
KEY	xx DPU	Key number, DN Pickup.
...		
KEY	xx DSP	Key number, Digit Display.

LD 15 - If the customer's Ringing Number Pickup Group is two or more digits in length (as configured in LD10/11, in response to the RNPG prompt), it must be configured in the Customer Data Block (in response to the PKND prompt); otherwise the Group Pickup key cannot be used by the group.

Prompt	Response	Comment
REQ:	CHG	Change existing data block
TYPE:	FTR_DATA	Customer Features and options
CUST	0-31	Customer number
- OPT	aaa	Options
- DGRP	(0)-2046	Maximum number of Dial Intercom Groups
- IRNG	(NO) YES	Intercom Ring
- PKND	(1)-4	Number of digits Dialed for Group Pickup
...		

LD 57 – Define the Flexible Feature Codes (FFCs) used to activate Call Pickup and Directed Call Pickup from a an analog (500/2500 type) telephone. The FFCs may also be used on Meridian 1 proprietary telephone sets.

Prompt	Response	Description
REQ	CHG	Change.
TYPE	FFC	Flexible Feature Code.

CUST	0-31	Customer number.
...		
CODE	mmmm	Specific FFC type.
- PURN	xxxx	Pickup Ringing Number code.
- PUGR	xxxx	Pickup Group code.
- PUDN	xxxx	Pickup DN code.

LD 18 – Configure a Speed Call List. This Speed Call List will be used by a Ringing Number Pickup Group (RNPg) or a set of RNPgS as a search list to scan the MCDN network.

The Speed Call List entries should contain digits which can be used to route a network Call Pickup request to a remote node (e.g., mainly the ISDN PINX DNs of the remote nodes which will be scanned after a network Call Pickup request). There must be no gaps in the Speed Call List (i.e., each Speed Call List entry should be present).

Due to the time it takes to scan the remote node, it is strongly recommended to configure less than six entries in the Speed Call List.

Prompt	Response	Description
REQ	NEW, CHG, OUT	New, change, or remove.
TYPE	SCL	Speed Call List.
LSNO	0-8190	Speed Call List number
...		
DNSZ	4-(16)-31	Maximum size of DNs allowed for Speed Call list.
SIZE	1-1000	Maximum number of DNs allowed in Speed Call list.
		Note: The size cannot be greater than the value entered against the STOR prompt below.
...		

STOR	000-319 xxxx	Speed Call List entry number and digits (PINX DN) stored against it. Note: The STOR entry cannot be blank.
------	--------------	--

LD 18 – On a per customer basis, define the Ringing Number Pickup Groups that are network wide by linking them to one of the previous defined Speed Call Lists. Different RNPGs may be linked to different Speed Call Lists.

Prompt	Response	Description
REQ	NEW, CHG, OUT	New, change, or remove.
TYPE	CPNW	Call Pickup Network Wide data.
CUST	0-31	Customer number.
LSNO	0-8190	A Speed Call List associated with Call Pickup network wide groups.
- GRP	0-4095 X0-4095	Ringing Number Pickup Group (RNPG) using this Speed Call List. Repeat for all groups sharing the same list. Enter <CR> to reprompt LSNO. Enter X to remove an RNPG.

LD 17 – Define the software Release ID at the far end of the D-Channel. Both the target and destination switches must be equipped with a minimum software vintage of Generic X11 Release 21 in order for Call Pickup Network Wide to be functional.

Prompt	Response	Description
REQ	CHG	Change I/O device.
TYPE	ADAN	Action Device And Number.
...		
- RLS	21	Release ID of the switch at the far end of the D-channel. Note: Both the target and destination switches must be equipped with a minimum software vintage of Release 21.
...		

LD 15 – Define the customer's Private Integrated Network Identifier (PNI) and Private Integrated Services Network Exchange (PINX) DN.

Prompt	Response	Description
REQ	CHG	Change.
TYPE	NET	Networking data.
CUST	0-31	Customer number.
...		
ISDN	YES	Allow ISDN for this customer.
- PNI	1-32700	Define the Private Network Identifier.
- PINX_DN	xx...x	Node DN, up to seven digits with DN Expansion package 150.
	X	Enter X to remove.

LD 15 – Define the special prefix code (SPRE) to be able to activate the Call Pickup features by dialing SPRE + xx.

Prompt	Response	Description
REQ	CHG	Change.
TYPE	FTR	Customer Features and options
CUST	0-31	Customer number.
...		
- SPRE	xxxx	Special Prefix number for this customer.
...		

LD 16 – Configure the PNI on the route. This PNI must correspond to the one configured in LD 15 on the target (remote) node.

Prompt	Response	Description
REQ	CHG	Change.
TYPE	RDB	Route data block.
ROUT	0-511	Route number.
...		
ISDN	YES	ISDN is allowed on this route.
- PNI	1-32700	Define the Private Network Identifier.

Feature operation

Display Call Pickup

This feature is only supported on Meridian Digital Telephones (with the exception of the M2317, and M3000).

- 1 Press the DSP key.
 - The DSP key is lit.
- 2 Press the RNP key.
 - The RNP key is flashing.
- 3 The display will show: Hbbbb1 Haaaa2

Where 1 = The DN of the originating party if it is local or available from CLID. If no CLID is available for a remote, originating party, either the route access code and the route member number are displayed if the ringing set is local, or dashes ("----") are displayed if the ringing set is remote. This is because the route access code of a route has no meaning on the requesting node. The "H" is displayed if the DN can be determined and it is located on another node.

Where 2 = The DN of the originally called (ringing) party. The “H” is displayed if the DN is located on another node than the requesting party.

- The RNP key is winking for five seconds.
- 4** Press the DN key.
- The DN key is lit.
- 5** Press the RNP key. If the RNP key is pressed during the five seconds it is winking, Directed Call Pickup by DN is attempted. If the RNP key is dark when pressed, normal Ringing Number Pickup treatment takes place.
- The RNP key is flashing.
- 6** You are connected to the call.
- The RNP key becomes dark.
 - For sets with display the following is shown:
“Name”1
Hcccc2 Hbbbb3 “P”4

Where 1 = Either the originating party’s name or the originally called party’s name is displayed depending on the requesting party’s Class of Service.

Where 2 = The DN of the originating party if it is local or available from CLID. If no CLID is available for a remote, originating party, either the route access code and the route member number are displayed if the ringing set is local, or dashes (“---”) are displayed if the ringing set is remote. This is because the route access code of a route has no meaning on the requesting node. The “H” is displayed if the DN can be determined and it is located on another node.

Where 3 = The DN of the originally called party. The “H” is displayed if the DN is located on another node than that of the requesting party.

Where 4 = The string defined in LD 95 for Call Pickup. The default is “P”

Ringing Number Pickup

To answer a call in your Call Pickup group from a Meridian Digital Telephone:

- 1** Lift the handset, or press a DN key.
 - The DN key is lit (if pressed).
- 2** Press the RNP key or dial SPRE + 3 or dial PURN FFC.
 - The RNP key is flashing.
- 3** You are connected to the call.
 - The RNP key becomes dark.
 - For sets with display, refer to step 3 under “Display Call Pickup”.

To answer a call in your Call Pickup group from an analog (500/2500 type) telephone:

- 1** Lift the handset.
- 2** Dial SPRE + 3 or PURN FFC.
- 3** You are connected to the call.

Directed Call Pickup by Group Number (Group Pickup)

To answer a call in another Call Pickup group from a Meridian Digital Telephone:

- 1** Lift the handset, or press a DN key.
 - The DN key is lit.
- 2** Press the GPU key or dial SPRE + 94 or dial PUGR FFC.
 - The GPU key is lit (if pressed).

- 3** Dial the pickup group number.
 - Once the group number is dialed completely, the GPU key is flashing to indicate that a search or scan is in progress.
- 4** You are connected to the call.
 - The GPU key becomes dark.
 - For sets with display, refer to Step 3 under “Display Call Pickup”.

To answer a call in another Call Pickup group from an analog (500/2500 type) telephone:

- 1** Lift the handset.
- 2** Dial SPRE + 94 or PUGR FFC.
- 3** Dial the pickup group number.
- 4** You are connected to the call.

Directed Call Pickup by Directory Number (DN Pickup)

To answer a call on a specified DN from a Meridian Digital Telephone:

- 1** Lift the handset, or press a DN key.
 - The DN key is lit.
- 2** Press the DPU key or dial SPRE + 95 or dial PUDN FFC.
 - The DPU key is lit (if pressed).
- 3** Dial the extension number.
 - Once the group number is dialed completely, the DPU key is flashing to indicate that a search or scan is in progress.
- 4** You are connected to the call.
 - The DPU key becomes dark.
 - For sets with display, refer to Step 3 under “Display Call Pickup”.

To answer a call on a specified DN from an analog (500/2500 type) telephone:

- 1 Lift the handset.
- 2 Dial SPRE + 95 or PUDN FFC.
- 3 Dial the extension number.

You are connected to the call.

Called Party Disconnect Control

This feature is not supported over ISDN facilities. Once the call clearing procedure is invoked, the call is taken down completely.

Calling Line Identification

Calling Line Identification (CLID) is a feature that delivers the calling party's telephone number to the called party's telephone set across the ISDN network. The CLID display lasts for the duration of the call.

The CLID display feature is supported for the following switch configurations:

- Meridian 1/SL-1 to Meridian 1/SL-1
- Meridian 1/SL-1 to DMS-100
- Meridian 1/SL-1 to SL-100

CLID supports both outgoing and incoming calls as follows:

Outgoing Calls

The calling party number that is sent out with the call SETUP message on the D-channel is based on:

- the numbering plan (private or public);
- the customer option configured in the Customer Data Block (LD 15), either Prime Directory Number (PDN) or Listed Directory Number (LDN);

Note: An attendant console can only be assigned an LDN.

- the class of service (COS) assigned to the set calling set.

If the numbering plan is private, the PDN is sent, regardless whether PDN or LDN is configured as the customer option.

If the numbering plan is public:

- if the customer option is set to LDN, then the set's Listed Directory is sent;

- if the customer option is set to PDN, either the Prime Directory Number or Listed Directory Number is sent, depending on the class of service (COS) assigned to the calling set in LD 10 or LD 11.

For private network calls, the calling party number consists of either the Electronic Switched Network (ESN) location code and the DN or the Coordinated Dialing Plan (CDP) DN. If the Prime DN is less than four digits, zeros are appended to create a four digit DN. If it is more than four digits, the last four numbers are used to identify the DN. For public network calls, it is the standard North American Numbering Plan seven or ten digit number.

Incoming Calls

For incoming calls across the ISDN network, the CLID received over the D-Channel is displayed instead of the trunk route access code and trunk member number.

The following devices, if equipped with a digit display, can receive and display a CLID number:

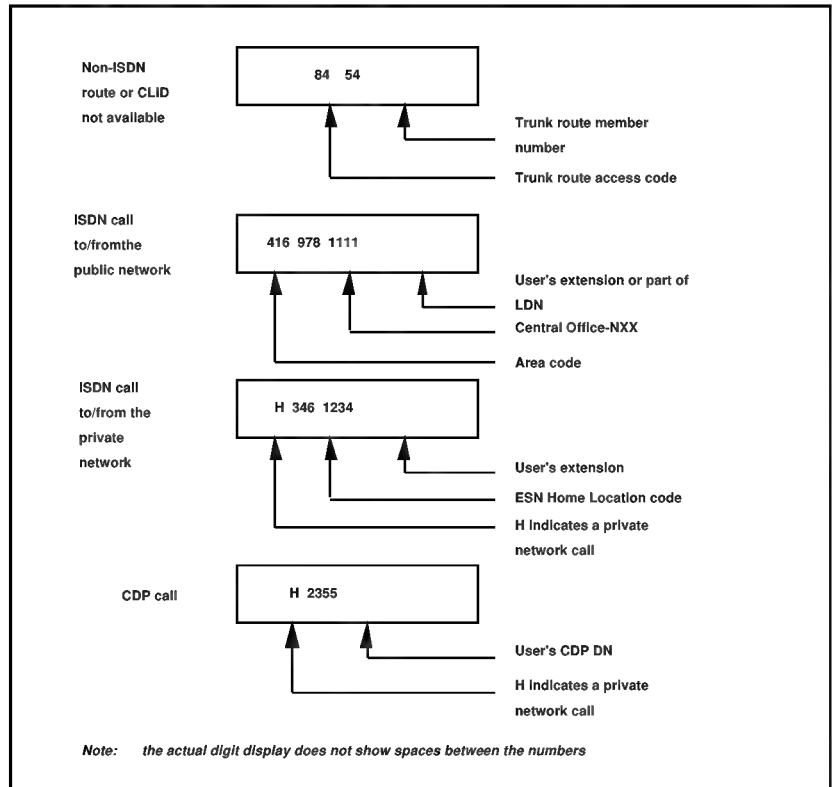
- Attendant Consoles
- Digital sets equipped with digit display
- ASCII terminals with data adapter such as ADM or programmable data adapter.

The digit display contents are described as follows:

- If the CLID display is unavailable because the call was not routed on ISDN routes, the trunk route access code and the trunk route member number are displayed. Note that Dialed Number Identification Service (DNIS) digits may be displayed as well if proper software is equipped.
- For public networks, the CLID displays the Standard North American Numbering Plan 10-digit number.
- For a private network with NARS, the CLID display is preceded by the letter "H", followed by the ESN Home Location Code and the user's extension number or the customer's Listed Directory Number.

- For a private network with CDP, the CLID display is preceded by the letter “H”, followed by the user's CDP directory number or the customer's Listed Directory Number.

Figure 5
Digit Display format for CLID



Package Requirements

Calling Line Identification requires the following:

ISDN (PRI or ISL)	option 145, 146 and/or 147
PRI	option 146 or ISL option 147
Digit Display	option 19

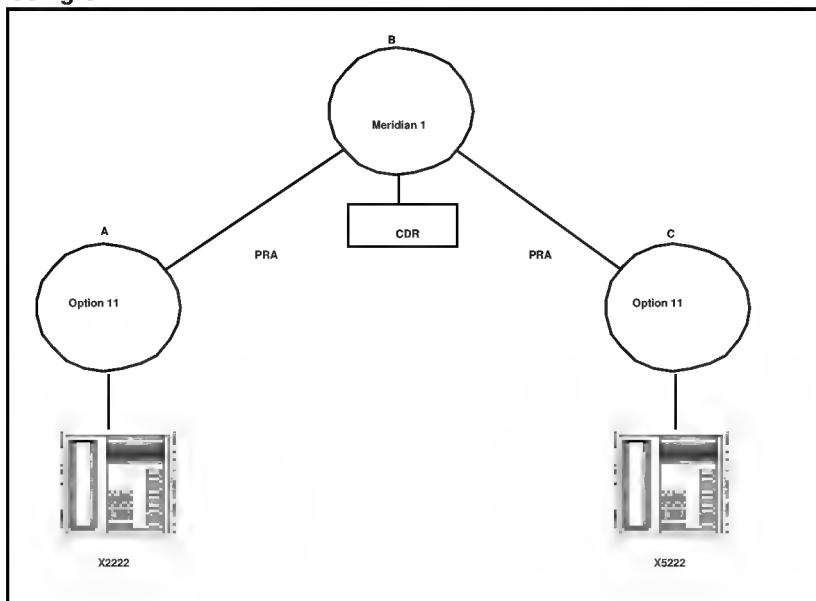
Calling Line Identification in Call Detail Record (CCDR)

This service provides the addition of a Calling Line Identification (CLID) field in the Call Detail Record (CDR). The addition of the CLID field will allow customers to charge back the calling party for services rendered in connection with their incoming calls. For example, calls placed to a service center may be charged back to departments receiving the service.

Another use of the CLID in CDR feature is to capture the actual calling DN at the tandem PBX. In a three Meridian 1 system configuration, when a user on PBX "A" calls PBX "C" through PBX "B", the callers CLID from PBX "A" can be captured on the CDR at PBX "B."

Note: Node B may also be a CO or other common carrier supporting CDR.

Figure 6
Using CDR



In this example DN 2222 on PBX A is calling DN 5222 on PBX C where PBX B is used as a tandem PBX. PBX B's CDR captures the actual extension (X2222) of the caller. Previously, only the trunk route and member number of the incoming TIE at PBX B could be captured.

Package Requirements

CDR package requirements are as follows:

ISDN	option 145
PRI	option 146 or ISL option 147
CLID in CDR	Option 118 is only required at the collecting location (i.e. site B)

Centralized Attendant Service (CAS)

CAS is not supported on the Option 11 system.

Calling Party Privacy

The Calling Party Privacy (CPP) feature enables the Meridian 1 to support the blocking of a Calling Party's Number and Name from being displayed at the terminating set on a per-call basis. Users can dial a Calling Party Privacy code (e.g., *67 from a Meridian 1 proprietary set or 1167 from an analog (500/2500 type) set) to prevent their telephone number and name from being displayed on a receiving telephone across the Public Switched Telephone Network (PSTN). Internal calls within the Meridian 1 will have originating numbers or names displayed even though the originating call has requested privacy.

This feature also allows a per-line blocking Class of Service to be programmed for station sets for public network calls. This relieves the user from having to dial the Flexible Feature Code (FFC) for every call, but in every other way is equivalent to the per-call blocking.

Depending on the trunk route configuration, public network numbers which tandem over the Meridian 1 Meridian Customer Defined Network (MCDN), prior to exiting to the PSTN, Privacy Indicator will be passed along if dialed by the originator. This means that users can be sure that their privacy wishes are respected whether the call exits directly at the originating node, or is given alternate routing through a private network. However, if private network nodes are connected by non Integrated Services Digital Network (ISDN) Electronic Switched Network (ESN) trunks, the complexity of the signaling precludes the transmission of the Privacy Indicator. To compensate for this, outgoing Central Office (CO), Foreign Exchange (FEX), Wide Area Telephone Services (WATS), and Direct Inward Dialing (DID) trunks, may be configured to automatically generate a Privacy Indicator for calls received from incoming non-ISDN trunks.

A Privacy Indicator is used to signify that a call is a Calling Party Privacy call. For an outgoing non-Integrated Services Digital Network (ISDN) trunk call, the Privacy Indicator is defined in the outgoing trunk route as a digit string (e.g., *67). No Privacy Indicator is expected for an incoming non-ISDN trunk call. For an ISDN call between two Meridian 1 switches, the Privacy Indicator is represented by setting the Presentation Indicator field to "Presentation Restricted" in the Calling Party Number Information Element (IE) and the Calling Party Name Display (CPND) Indicator to "Presentation Denied" in the Display IE. For an outgoing ISDN call to the Public Exchange/Central Office, the Privacy Indicator is represented by setting the Presentation Indicator field to "Presentation Restricted" in the Calling Party Number IE and excluding the Display IE with the CPND information. An incoming ISDN call is marked as a CPP call (i.e., carries the Privacy Indicator) if the Presentation Indicator field is set to "Presentation Restricted" in the Calling Party IE or the CPND Indicator is set to "Presentation Denied" in the Display IE.

Operating parameters

The code to be dialed by the user can be flexibly defined, although *67 will be usual in North America. Multiple codes can be defined allowing a different code (e.g., 1167) to be used for rotary sets.

The code which is outpulsed on non-ISDN analog or digital trunks can also be flexibly defined on a per-route basis. Different codes can be programmed for routes which mix Digitone (DTN) and Dial Pulse (DIP) Classes of Service.

Frequently, the codes outpulsed on trunks will be the same as those dialed from station sets, but there is no reason why they cannot be different.

A non-ISDN trunk route will not be able to provision the CPP feature if Outpulsing of Asterisk and Octothorpe (OPAO) package 104 is equipped on the switch. During SYSLOAD, the CPP database will be removed from the non-ISDN trunk routes if the OPAO package is equipped.

Central Office Trunk (COT), Foreign Exchange (FEX), Wide Area Telephone Service (WATS), and Direct Inward Dialing (DID) are the only trunk route types allowed to outpulse the Privacy Indicator for an outgoing non-ISDN call.

ISDN implementations include DSM-100/250, SL-100, AT&T4, AT&T5, TR-1268 (NI-2) and Meridian Customer Defined Network (MCDN) private networks.

The Privacy Indicator defined for a non-ISDN trunk route (dial pulse or digitone) consists of any arbitrary digit sequence (0-9) up to four digits in length. The asterisk "*" or octothorpe "#" is not allowed in the Privacy Indicator for an outgoing dial pulse trunk route. The asterisk is only allowed as the first digit of the Privacy Indicator (e.g., *67) for an outgoing digitone trunk route; the octothorpe is not allowed in any Privacy Indicator on an outgoing digitone trunk route.

If as user requests privacy by dialing the Flexible Feature Code (FFC) defined for the CPP feature, and CPP is not provisioned in the outgoing trunk route, the call will proceed without carrying the Privacy Indicator.

No Privacy Indicator is expected to be received from the Public Exchange/
Central Office on non-ISDN DID trunks. This would be treated as a misdial.

The CPP feature will not inhibit the Calling Party Number and Name from being displayed for an internal call within a local Meridian 1 customer group.

A common number defined for the Special Prefix (SPRE) code in the database is “1”. Thus, “1167” will not be accepted as an FFC for CPP due to the conflict with existing DNs. The technician should either change the SPRE code, or define a new FFC for CPP to be used by a rotary telephone.

Feature interactions

Autodial

An outgoing trunk call initiated by pressing the Autodial key will carry the Privacy Indicator if the Calling Party Privacy (CPP) code followed by the normal dialing sequence is stored against the Autodial key. The CPP code is counted against the maximum number of digits (currently 23) stored against the Autodial key.

A user can also store the CPP code against the Autodial key. An outgoing CPP call can be initiated by pressing the Autodial key, followed by manually dialing the digits.

An outgoing CPP call can also be initiated by dialing the CPP code, followed by pressing the Autodial key against which the normal dialing sequence of digits have been stored.

Automatic Call Distribution

A call placed by means of Enhanced Automatic Call Distribution (ACD) Routing, Enhanced Interflow, Enhanced Night Call Forward, Enhanced Network Routing, or Network ACD will respect the CPP request of the originator.

Automatic Call Distribution MAX (ACD MAX)

The Calling Line Identification (CLID) is still included in ACD MAX reports, even if the caller has requested CPP.

Call Detail Recording

The current Call Detail Recording (CDR) records which include the Calling Party Number will continue to do so even if the caller has requested CPP. The FFC for CPP dialed by the user will be included in the dialed digits field when generating a CDR record.

An outgoing non-ISDN trunk call outpulsing the Privacy Indicator will include the Privacy Indicator in the outpulsed digits field when generating the CDR records if the outgoing non-ISDN trunk route has Outpulsed Digit Option (DPD) activated.

Call Forward All Types***Hunt***

If an incoming ISDN trunk call with the Privacy Indicator is forwarded, the Privacy Indicator will be tandemmed to the far end to inhibit the display of the Calling Party Name or Number provided that the outgoing trunk route on the tandem node also has CPP provisioned.

If an incoming non-ISDN trunk call is forwarded to a trunk, the outgoing trunk call from the tandem node will carry the Privacy Indicator if the outgoing trunk route on the tandem node has the TCPP option set.

The CPP code can also be stored on the forwarding DN. If the CPP is requested on the forwarding DN, the Privacy Indicator will be outpulsed to the terminating node to inhibit the number of the forwarding set (i.e., at the tandem node) from being displayed on the terminating set. In this case, the forwarding station must include the CPP in the forwarding DN (such as *67 + ACOD + the DN on the terminating node).

The above scenario also applies to Hunt and Network Hunt.

Call Hold, Deluxe***Call Hold, Permanent***

When a user takes an incoming trunk call with the Privacy Indicator off of hold, no Calling Party Number or Name will be displayed on the set.

Call Pickup

If an incoming trunk call with the Privacy Indicator is picked up locally, the display of the calling Party Number and Name are not displayed on the terminating set.

Call Pickup Network Wide

If an incoming trunk call with the Privacy Indicator is picked up by a remote set (requesting party), the display of the calling Party Number and Name are not displayed on the requesting set.

Call Transfer

If an incoming non-ISDN call is being transferred or an incoming ISDN call is transferred to a non-ISDN trunk, the Calling Party Name and Number will not be passed on to the terminating set. The CPP feature will not change this operation.

For cases where an incoming call with the Privacy Indicator is transferred over an MCDN trunk, or to a local station, the name and/or number of the originating party will not be displayed on the set of the final terminating party.

Calling Line Identification Restriction (CLIR)

The Flexible Feature Code is not supported on BRI sets. Calling Party Privacy can only be requested by setting the soft key “ID PRES” (if it exists) to “Denied” or the “PRES” prompt to “NO” in LD 27. If the Calling Party Number IE with the Presentation Indicator set to “Presentation Allowed” is included in the SETUP message generated by the BRI terminal, this BRI terminal will not allow Calling Party Privacy, as the Presentation Indicator generated by the BRI terminal always overwrites the CLIR service option.

Call Party Name Display (CPND)

In current operations an incoming ISDN call with the Call Party Name Display (CPND) Indicator field set to “Presentation Denied” still displays the Calling Party Name.

The CPP feature will inhibit the display of the Calling Party Name for an incoming ISDN call with the CPND Indicator field set to “Presentation Denied”.

Conference

The CPP feature will pass the Privacy Indicator to the terminating set to inhibit the display of the Calling Party Name and Number if the Conference feature is used for the purpose of performing a transfer.

Calling Party Name Display Denied

For outgoing calls, if the CPP package is equipped, the CPP feature will take precedence over the Calling Party Name Display Denied feature for restricting the Calling Party Name and Number. For example, if an outgoing ISDN call is marked as a CPP call, the outgoing SETUP message will include the Calling Party Number IE with the Presentation Indicator set to “Presentation Restricted” and the Display IE with the CPND Indicator set to “Presentation Denied”, to inhibit both the Calling Party Number and Name being displayed on the terminating set, regardless of whether or not the Calling Party Name Display Denied feature allows the display of the Calling Party Name and/or Number.

The Calling Party Name Display Denied feature takes precedence over the CPP feature for displaying an incoming ISDN call.

Feature Group D

If an incoming Feature Group D (FGD) call terminates at a Meridian 1 switch locally, the received 10-digit Automatic Number Identification (ANI) will be displayed on the terminating set if the Show ANI Digits on Terminal Displays (SHAN) field is set to “YES” in the FGD data block associated with the incoming trunk route. If the originator requests CPP, the end office will not send the 10-digit ANI to the PBX.

If an incoming FGD call is routed to another switch via ISDN Primary Rate Interface (PRI) or Integrated Service Link (ISL), the outgoing SETUP message will include the 10-digit ANI (if it exists) as the Calling Party Number with the Presentation Indicator set to “Presentation Restricted” if the outgoing trunk route has the TCPP option on. The TCPP option takes precedence over the SHAN field defined in the FGD data block associated with the incoming trunk route to restrict the 10-digit ANI display.

Hot Line

A Hot Line call will carry the Privacy Indicator if the Calling Party Privacy (CPP) code followed by the normal dialing sequence is stored in the Hot Line DN. The CPP will count against the maximum number of digits (currently 31) allowed for the Hot Line DN.

Incoming Trunk Programmable CLID

If the incoming trunk route is a non-ISDN route, the billing number assigned by the incoming trunk route will be passed to the Public Exchange/Central Office with the Presentation Indicator field set to “Presentation Restricted” if the outgoing ISDN trunk route has the TCPP prompt set to “YES”. If the TCPP prompt is set to “NO”, the Presentation Indicator is set to “Presentation Restricted” only if the BDSP (Billing Display) prompt in the incoming trunk route is set to “NO”.

If the incoming trunk route is an ISDN route, the “Restricted” Presentation Indicator will be tandemed to the outgoing trunk route. If the Presentation Indicator is set to “Presentation Allowed” or no Calling Party Number IE is received in the incoming trunk route, the billing number assigned by the incoming trunk route will be passed to the Public Exchange/Central Office with the Presentation Indicator field set to “Presentation Restricted” only if the incoming trunk route has the BDSP prompt set to “NO”.

Last Number Redial

The Last Number Redial (LNR) feature will store the CPP code in the LNR data space if the CPP code was included in the last number dialed by the user. Any subsequent outgoing redialed call will send the Privacy Indicator to the far end.

Malicious Call Trace

Incoming calls to stations having the Malicious Call Trace feature enabled will continue to include the Terminal Number (TN) of the calling party in the Malicious Call Trace record, even if the caller has requested CPP.

Meridian Link

The CLID is still included in the Application Module Link (AML) messages sent to the Meridian Link Module even if the call has requested CPP.

Meridian Mail

When an incoming ISDN call with the Privacy Indicator terminates on Meridian Mail, the Calling Party Name and Number will not be passed to Meridian Mail to be recorded. When the called party retrieves the messages, no Calling Party Number or Name will be played, and the called party will not be able to initiate the Call Sender feature either, since no CLID is recorded.

Calls placed by means of Through Dial will be able to request privacy. These are calls where the person accessing Meridian Mail can dial 0 followed by any telephone number. The caller will be able to dial the CPP code as part of the number following 0.

Meridian MAX

The CLID is still sent to the Meridian MAX even if the caller has requested CPP.

Meridian 911

An incoming 911 call with ANI information will always display the ANI digits on the terminating set or pass the ANI information to the Meridian 911 application.

Network Message Services

An incoming trunk call with the Privacy Indicator will not display the Calling Party Name and Number on the Message Center operator's terminal.

Network Ring Again

A call placed by means of the Network Ring Again feature will respect the CPP requested when the call was originally dialed.

Private Line Service

The Private Line Service feature will outpulse the Privacy Indicator only if it is dialed by the originator. An asterisk will be outpulsed to the far end only if it is an OPAO call, otherwise the asterisk signals a three-second pause.

Ring Again – Busy Trunk

A call automatically redialed by the Ring Again – Busy Trunk feature will respect the CPP requested when the call was originally dialed.

Speed Call

System Speed Call

An outgoing trunk call initiated by dialing the Speed Call code will carry the Privacy Indicator if the CPP code followed by the normal dialing sequence is stored in the Speed Call Entry represented by the Speed Call code. The CPP code will be counted against the maximum number of digits (currently 31) allowed per Speed Call list entry.

A user can also store the CPP code in the Speed Call Entry (or Speed Call key). An outgoing CPP call can then be initiated by dialing the Speed Call code (or pressing the Speed Call key), followed by manually dialing the digits.

However, existing Speed Call limitations do not allow a user to dial *67 (or anything else) before accessing a Speed Call list entry.

Stored Number Redial

During Stored Number Redial (SNR) programming, a user can store the CPP code followed by the normal dialing sequence in the SNR data space. Outgoing calls originated by the SNR feature will send the Privacy Indicator to the far end. The CPP code will be counted against the maximum number of digits (currently 31) allowed by the SNR feature.

During an active call on a Meridian 1 proprietary telephone, the Stored Number Redial feature will store the CPP code in the SNR data space if the CPP code was included in the number dialed by the originator. The outgoing redialed calls will send the Privacy Indicator to the far end.

Trunk Optimization Before Answer

An optimized call due to Trunk Optimization Before Answer will respect the CPP requested by the originator.

Feature packaging

Calling Party Privacy (CPP) is package 301, which requires Flexible Feature Codes (FFC) package 139. Non ISDN trunks must restrict the Outpulse Asterisk and Octothorpe (OPAO) package 104 to provision the CPP feature.

Feature implementation

If the CPP package is equipped in the Meridian 1 system, the following steps illustrate how to configure Calling Party Privacy.

- 1 Define the FFC for the CPP feature. FFC package 139 is required for loading LD 57.

LD 57 – Define the FFC for CPP Code.

Prompt	Response	Description
REQ	NEW, CHG	Add, or change.
TYPE	FFC	Flexible Feature Code.
CUST	0-31	Customer number.
FFCT	(NO), YES	Flexible Feature Confirmation Tone.
...		
CODE	CPP	FFC type to be altered. CPP entry is only allowed if the CPP package is equipped. <CR> means that no FFC types are prompted.
...		
CPP	(*67), nnnn	Calling Party Privacy code. CPP is prompted only if the CPP package is equipped. Any arbitrary digit sequence up to four digits can be specified. For Meridian 1 proprietary set, an “*” can be entered as the first digit. CPP will be prompted until a <CR> is entered.

LD 16 – Define Privacy Indicators.

Prompt	Response	Description
REQ	NEW, CHG	Add, or change.
TYPE	RDB	Route Data Block.
CUST	0-31	Customer number.
TKTP	COT, DID, FEX, WAT	Trunk Route Type.
...		
DTRK	YES	Digital trunk route.
DGTP	DTI	Digital trunk type.
ISDN	YES	ISDN PRI option.
...		
ACOD	nnnn	Trunk Access Code.
CPP	YES	Calling Party Privacy. YES = This trunk route is enabled for the recognition of the Calling Party Privacy feature. CPP is only prompted if the following conditions are met: the CPP package is equipped, the OPAO package is not equipped, OGT (outgoing) or IAO (incoming and outgoing) trunk, non ISDN option and trunk route type is COT/DID/FEX/WAT. The default value for the CPP prompt is NO.
TCPP	(NO), YES	CPP for an incoming trunk call tandemed to this trunk route. YES = An incoming non-ISDN trunk call tandemed to this trunk route will carry the Privacy Indicator. The default value for the TCPP is NO.

- DTPI	nnnn	Privacy Indicator for a digitone trunk. DTPI is prompted only if CPP is set to "YES" and the trunk route is non-ISDN. If CPP is changed from NO to YES, the default is *67. Any arbitrary digit sequence (0-9) up to four digits can be specified. An asterisk "*" is allowed to be the first digit only if the outgoing call goes to a Public Network.
- DPPI	nnnn	Privacy Indicator for a dial pulse trunk. DPPI is prompted only if CPP is set to "YES" and the trunk route is non-ISDN. If CPP is changed from NO to YES, the default is 1167. Any arbitrary digit sequence (0-9) up to four digits can be specified.

- 2 CPP is only prompted if the CPP package is equipped, the OPAO package (104) is not equipped, the trunk is outgoing (OGT) or incoming and outgoing (IAO), non-ISDN option and the trunk route type is COT, DID, FEX or WAT.
- 3 CLBA Class of Service activates Calling Party per-line blocking. CLBD Class of Service deactivates Calling Party per-line blocking; however, the user can still request Calling Party Privacy by dialing the CPP code.

LD 10/11 – Activate Calling Party per-line blocking.

Prompt	Response	Description
REQ	NEW, CHG	Add, or change.
TYPE	nnnn	Type of telephone.
TN	c u	Terminal Number for the Option 11C.
...		
CLS	CLBA	Activate Calling Party per-line blocking. Enter CLBD to deactivate Calling Party per-line blocking. CLBD is the default.

Feature operation

Any outgoing call initiated from a set with Calling Party per-line blocking (CLBA) Class of Service will request Calling Party Privacy.

If the originating party has CLBD Class of Service, the Calling Party Privacy feature can only be activated on a per-call basis; if standard dialing procedures are used, no CPP is requested, and the call will proceed as usual. The user must do one of the following to request CPP:

- 1 Precede any dialing of a call with a new Flexible Feature Code defined for the CPP feature. This operates from all telephone types, except BRI sets.
- 2 The Flexible Feature Code is not supported on BRI sets; however, Calling Party Privacy can be requested by setting the softkey “ID PRES” (if it exists) to “Denied” state or the “PRES” prompt to “NO” in LD 27.

Note: If the Calling Party Number IE with the Presentation Indicator set to “Presentation Allowed” is included in the SETUP message generated by the BRI terminal, this BRI terminal will not allow Calling Party Privacy, as the Presentation Indicator generated by the BRI terminal always overwrites the CLIR service option.

Coordinated Dialing Plan

This package can be used with NARS (Option 58) or as a standalone feature to provide a coordinated dialing plan in an ISDN environment.

Package Requirements

Package requirements are as follows:

BRTE	option 14
BQUE	option 28
NCOS	option 32
FCBQ	Option 117

Data Packet Network Access X.25

PRI trunks may be configured to access a Public Data Packet Network (DPN - X25) via the DMS-100 ISDN node, provided that this service is made available by the serving Central Office. On a per call basis, any B-channel can be used to access the packet network.

No high-speed data is currently available on Option 11.

Package Requirements

The package requirements are as follows:

ISDN	option 145
PRI	option 146

DCH Error Reporting and Monitoring

DCH Error Reporting and Monitoring are an ISDN Primary Rate Interface feature that provides messages that indicate the cause of the establishment or release of the D-Channel to aid in diagnosis during installation and maintenance.

D-channel message monitoring is used to analyze and screen the Layer 3 protocol messages traveling between the near and far end D-channels.

With X11 Release 16, message monitoring can be performed only on a per D-channel basis using LD 96. That is, once the message monitor is turned on, all messages are output for that D-channel. The messages output might be excessive.

X11 Release 18 provides additional commands in LD 96 that allows selective message monitoring based on:

- the D-channel
- the B- or ISL channel
- the message types for a specific feature
- any specific message

Refer to the *X11 Software Guide* provided with your Option 11 system for details about the operation and use of LD 96 and the DCH Error Reporting Digital Trunk Interface and Primary Rate Interface Time Slot Reuse (DTI/PRI)

This feature eliminates call blocking due to time slots being unavailable. By allowing a time slot reserved for a primary function to be reused for any subsequent requirements during call processing, all channels on DTI or PRI loops will be available for use.

Time slots reserved for a particular DTI or PRI channel are stored in an unprotected data structure allowing easy access, such as a call register. Each time a new path is required for the same DTI or PRI channel, the data structure can be accessed to determine if there is a reserved time slot that can be reused. If the new path requirements is intra-group (single-group switch), then the time slot can be reused. If the new path requirement is inter-group (multi-group switch), the reserved time slot can be reused if a matching junctor slot is available.

A count is kept of the number of times that a time slot has been reused. The time slot is not idled until all reservations have been canceled.

This feature applies to the following loop types on single-group switches:

- 1.5 Mbit 24-channel DTI
- 2 Mbit 30-channel DTI
- 1.5 Mbit 23 B+D PRI
- 2 Mbit 30 B+D PRI, and
- 2 Mbit Japan Digital Multiplex Interface (DMI).

Operating parameters

This feature applies only to network enhanced machines.

Feature interactions

None.

Feature packaging

None.

Feature implementation

None.

and Monitoring feature.

Direct Inward System Access (DISA)

Special dial tone is returned in-band only on the B-channel. Additional code digits are via in-band DTMF tones.

Display of Calling Party Denied

Display of Calling Party Denied (DPD) permits Analog (500/2500 type) and Meridian 1 proprietary sets to either allow or deny associated name and directory number information from being displayed on other sets when involved in a call. This feature is supported on internal calls (same node) and calls placed over a Meridian Customer Defined Network (MCDN) Integrated Services Digital Network (ISDN).

DPD uses the following Class of Service options in LD 10 and LD 11: Display Digits Allowed/Denied (DDGA/DDGD) Name Display Allowed/Denied (NAMA/NAMD). Display of Calling Party Denied Class of Service options are programmed on a per set basis.

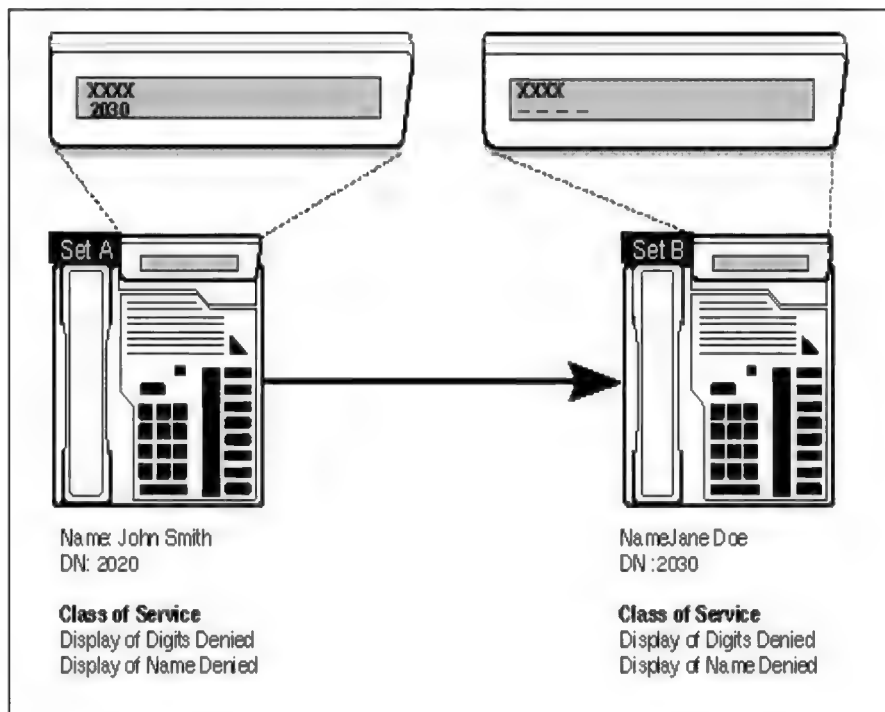
Table 2 outlines the possible configurations and the resulting display on both the calling and called parties display.

Table 2
Display Scenarios on Calling and Called Party's Sets.

CALLING PARTY'S CLASS OF SERVICE	CALLED PARTY'S CLASS OF SERVICE	DISPLAY OF CALLING PARTY	DISPLAY OF CALLED PARTY
DDGA NAMA	DDGA NAMA	Called Party's DN Name of Called Party	Calling Party's DN Name of Calling Party
DDGA NAMA	DDGD NAMD	Called Party's DN X X X X	Calling Party's DN Name of Called Party
DDGD NAMD	DDBA NAMA	Called Party's DN Called Party's Name	----- X X X X
DDGD NAMD	DDGD NAMD	Called Party's DN X X X X	----- X X X X

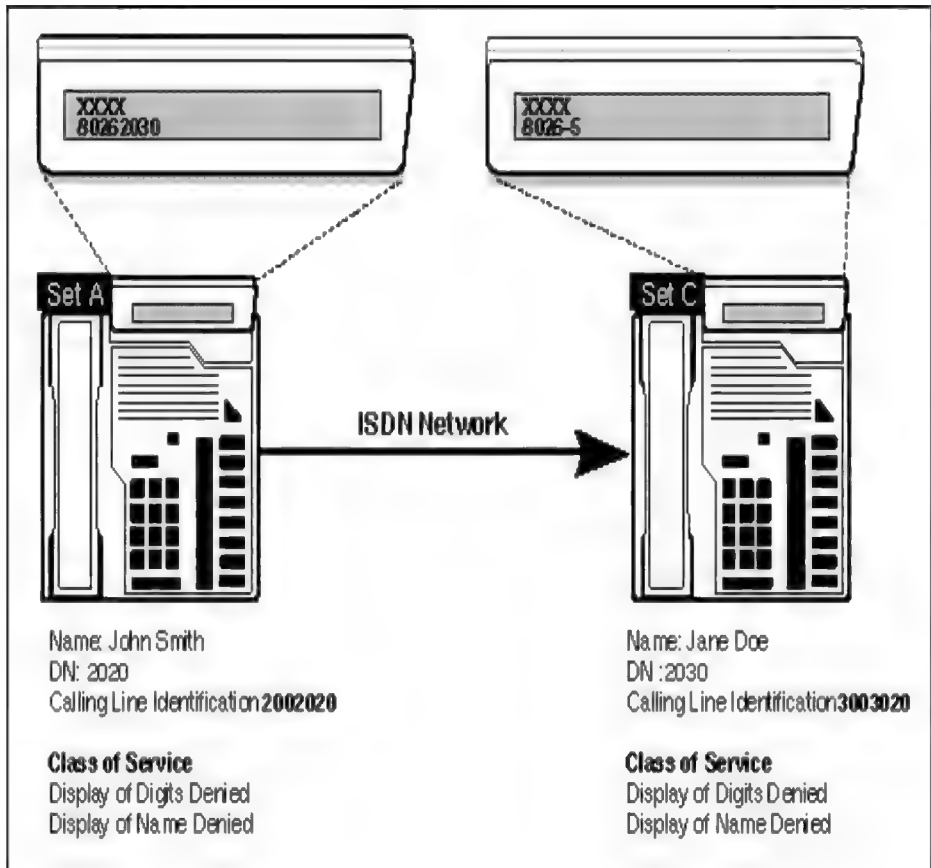
Figure 7 illustrates the functionality of Display of Calling Party Denied (DPD) on a nodal basis when both the calling and called parties have enabled DPD Class of Service options. The calling party has configured a Digit Display Denied (DDGD) and Name Display Denied (NAMD) Class of Service. The called party has the same Class of Service options programmed. When the calling party dials the called party, the called party's set restricts the display of the calling party's associated name and directory number. The calling party's name is replaced by a string of dashes (-----), and the associated name is replaced by the string X X X X.

Figure 7
Calling Party and Called Party on the Same Node



As illustrated Figure 8, for calls placed over a MCDN ISDN network, a Display of Calling Party Denied and Display Digits Denied (DDGD) on the calling party's set, prevents the Calling Line Identification (CLID) from being displayed on the called party's set. In this case, the calling party's CLID is replaced by the ISDN route access code and route member number. If the calling party has configured Name Display Denied (NAMDD), the calling party's associated name is not displayed on the called party's set.

Figure 8
ISDN Network Calls



Operating parameters

Display of Calling Party Denied (DPD) is only supported on internal calls and Meridian Customer Defined Network (MCDN) ISDN networks.

Display of Calling Party Denied is not supported on ISDN BRI sets.

The called party's directory number always appear on the display of the calling party's set. This occurs whether or not the called party has a Digit Display Denied (DDGD) Class of Service.

Feature interactions

Attendant Console

An Attendant Console's display is not impacted by this feature. Display is provided to an attendant regardless of the Class of Service configured on a set. To prevent the display of calls placed over an ISDN network, Network Attendant Service (NAS) must be configured.

Call Detail Recording

For internal calls, calling and called party's Directory Numbers are included in Call Detail Recording (CDR) records. For MCDN ISDN network calls, the calling or connected party's DN is included in the CDR regardless of the set's Class of Service.

Call Forward All Type

When a set activates any of the call forwarding features, display information on incoming calls is updated in accordance with the Class of Service programmed for that Directory Number.

The terminating set display is dependent on the Calling Party Name Display (CPND) Dialed Name Display Denied/Allowed Class of Service. If the terminating set has a Dialed Name Display Allowed, the display on the terminating set reflects the name and DN of the forwarding set and the DN of the calling party. The terminating set's display is dictated by the DPD Class of Service options configured. If these options are set to denied, then dashes and X's are displayed.

For a MCDN ISDN call, calling party's Calling Line Identification (CLID) is replaced with the ISDN route access code (ACOD) and the route member number, and the calling party's CLID is replaced with a string of dashes.

Call Hold

When a call is retrieved from hold, the calling and called party's displays reflect their individual Class of Service options.

Call Park

When the Call Park timer expires on a parked call, a set's display does not include the name and DN of the calling party. When a parked call is retrieved by another set, display information is based on the Class of Service of individual sets.

Call Pickup

When a call is picked up from another set, the terminating set's display is in accordance with the Class of Service of individual sets. The calling party's display includes the dialed DN, the terminating DN and the name of the terminated set. However, if the terminating set has Digit Display Denied (DDGD), then both the called and terminating sets' DNs are blocked from the calling party's display. The same occurs with Digit Display Allowed (DDGA); both the called and terminating sets' DNs are displayed on the calling party's set.

Call Transfer

When a set transfers a call, display information is updated according to the Class of Service of the respective Terminal Numbers (TNs). This occurs for both internal and ISDN network calls.

When a call is transferred to another Meridian 1, the calling party's DN and name information is sent and displayed on the set that answers the call. However, if the calling party has Name Display Denied, then the name information is not transferred to the set that answers the call.

If a blind call transfer occurs, the DN of the terminating set is displayed to the calling party, regardless of the DPD Class of Service options configured.

Calling Party Name Display

Display of Calling Party Denied transfers display information that is used by the Calling Party Name Display (CPDN) feature for ISDN calls. If the CPDN of an incoming call is set to "Presentation Denied", the calling party's name information is restricted on the called party's set. For internal calls, name information is taken directly from a set's data block.

Calling Party Privacy

Calling Party Privacy takes precedence over Display of Calling Party Denied on outgoing calls over an MCDN ISDN network. This precedence pertains to the display of the calling party and the name of the called party.

Calling Party Privacy does not affect internal calls using Display of Calling Party Denied.

Conference

For internal and network conference calls, display information is not provided on any of the conferee's sets. When setting up a conference call, by conferencing one set at a time, the display on the conferee's set is in accordance with individual Class of Service. Display is provided for conference calls when the sets are located over the same network.

Dial Intercom

Display information on sets involved in a Dial Intercom Group (DIG) call is based on the individual Class of Service of each set. If a DN is denied for a set involved in a DIG call, the DIG number for that set is replaced by one dash (–) in the case of 10 DIG stations. For 100 DIG stations, the DIG number is replaced by two dashes (– –).

Group Call

The calling party's display shows the DN of the last set to connect into the Group Call, regardless of the Class of Service. The called sets display the Group Number only.

Hot Line

Display information on sets in a Hot Line call is based on the individual Class of Service of each set.

Meridian 911

An incoming M911 call with Automatic Number Identification (ANI) information always displays ANI digits on the terminating set, regardless of the calling party's DPD Class of Service.

Meridian Mail

A calling party's name and/or DN within Meridian Mail are not impacted by this feature. When a Digit Display Denied (DDGD) call is forwarded to Meridian Mail, the calling party's DN is provided to Meridian Mail and is available when reviewing messages.

Multiple Appearance Directory Number

When a Multiple Appearance Directory Number (MADN) is dialed and ringing, the calling party's display does not show name information, provided that at least one of the MADN TNs has a Name Display Denied (NAMDD) Class of Service.

The called party's display shows the name and number of the calling party, according to the Class of Service of the calling party's TN.

Network Attendant Services

When a call is placed to an attendant over an ISDN network with Network Attendant Services (NAS) configured and Calling Party Name Display (CPND) equipped, the Attendant Console displays the calling party's DN and name. The same occurs when an attendant places a call over the network; however, an Attendant Console's display shows the connected party name and number.

If NAS is not configured, the name and calling/connected party's number is displayed to the attendant provided that the calling/connected party has the Display of Calling Party Denied (DPD) Class of Service options configured to Allowed. If Class of Service options are set to Denied, then this information is not displayed to the attendant.

No Hold Conference**Voice Call**

Display information on sets involved in a No Hold Conference and Voice calls are based on the individual Class of Service of each set.

Feature packaging

For internal calls, Display of Calling Party Denied (DPD) requires Calling Party Name Display (CPND) package 95.

ISDN Network calls require Calling Party Name Display (CPND) package 95 and Integrated Service Digital Network (ISDN) package 145.

Feature implementation

LD 10 – Allow Directory Number Display and Name Display for Analog (500/2500) type sets.

Prompt	Response	Description
REQ	CHG	Change.
TYPE	500	500/2500 type set data block.
TN	c u	Terminal Number.
...		
CLS	DDGA	Directory Number Display Allowed (default). DDGD = Directory Number Display Denied.
CLS	NAMA	Name Display Allowed (default). NAMD = Name Display Denied.

LD 11 – Allow Directory Number Display and Name Display for Meridian 1 proprietary sets.

Prompt	Response	Description
REQ	CHG.	Change.
TYPE	xxxx	Telephone type, where: xxxx = SL1, 2006, 2008, 2009, 2016, 2018, 2112, 2216, 2317, 2616 or 3000.
TN	c u	Terminal Number
...		
CLS	DDGA	Directory Number Display Allowed (default). DDGD = Directory Number Display Denied.
CLS	NAMA	Name Display Allowed (default). NAMD = Name Display Denied.

Feature operation

Internal Call

Calling Party's Class of Service Digit Display Denied (DDGD)

- 1 Set A, Calling Party, dials Set B, Called Party.
- 2 Set A's Digit Display Denied (DDGD) Class of Service prevents Set A's DN from being displayed on Set B. Set A's DN is replaced by "— — —" on Set B's display.

Calling Party's Class of Service Name Display Denied (NAMD)

- 1 Set A, Calling Party, dials Set B, Called Party.
- 2 Set A's Name Display Denied (NAMD) Class of Service prevents Set A's name from being displayed on Set B. Set A's name is replaced by "X X X X" on Set B's display.

Called Party's Class of Service Name Display Denied (NAMD)

- 1 Set A, Calling Party, dials Set B, Called Party.

Set A has a Name Display Denied(NAMD) Class of Service. Set B also has a Name Display Denied (NAMD) Class of Service.Set B's Class of Service prevents Set B's name from being displayed on Set A.

E.164/ESN Numbering Plan Expansion

The E.164/ESN Numbering Plan Expansion feature provides the capabilities to meet the International Telegraph and Telephone Consultative Committee (CCITT) recommendation E.164 for Integrated Services Digital Network (ISDN) and Public Switching Telephone Network (PSTN) dialing.

Generally, the following enhancements are offered by this feature:

- the support of the numbering plan for ISDN and PSTN dialing has been increased to a 15-digit maximum, from a 12-digit maximum;
- the removal of the leftwise-unique restriction imposed on ESN Supplemental Digit Restriction and Recognition (SDRR) entry codes. For example, if 555 is an existing entry, a new entry of either 55 or 5551212 can be entered;

- the addition of “allow” (ALLOW) as a new Supplemental Digit Restriction and Recognition (SDRR) entry type in LD 90. There are now nine entry types for Supplemental Digit Restriction and Recognition. One entry type (DENY), denies a call from going through if the digits in the SDRR entry match the dialed digits. There are seven other entry types that provide special treatments if the digits in the SDRR entry matches the dialed digits. The new ALLOW entry allows a call to go through, if the dialed digits did not match any entry within the Supplemental Digit Restriction and Recognition table;
- the Special Number Translation (SPN) screening digits scheme is changed; and
- the capability of the Meridian 1 base features to store digits is increased to 31 digits.
- the capability to send up to 32 digits to the Extended Conference and Tone & Digit Switch card, allowing an International Number to be sent in a single Automatic Number Identification (ANI) message. Previously, only 16 digits could have been outputted in a single ANI message, which included the start digit, the end digit, and an optional information digit. This left only 13 or 14 digits of the actual International Number to be outputted in a single ANI message. This meant that the International Number may have been sent in two separate ANI messages.

The specific enhancements delivered by the E.164/ESN Numbering Plan Expansion feature are provided by the tables that follow.

Summary of new ESN functionalities

Table 3 summarizes the changes made to the ESN functionality.

Please note that the components that are not affected are not listed.

Table 3 - Summary of ESN changes.

Component	Old	New
Maximum number of digits for a Special Numbering Translation screening.	11	19
Maximum number of Digit Manipulation Index (DMI) deletion digits.	15	19
Maximum number of Digit Manipulation Index (DMI) insertion digits.	24	31
Maximum number of Supplemental Digit Restriction and Recognition (SDRR) tables, with BARS.	256	1500
Maximum number of Supplemental Digit Restriction and Recognition (SDRR) tables, with NARS.	512	1500
Maximum number of words per Supplemental Digit Restriction and Recognition (SDRR) entry.	3	4
Maximum number of digits in each Supplemental Digit Restriction and Recognition (SDRR) entry.	7	10
Maximum length of Flexible Numbering Plan (FNP) Flexible Digit Number Length (FLEN) numbers for Special Number Translation (SPN).	16	24
Maximum length of Flexible Numbering Plan (FNP) Flexible Digit Number Length (FLEN) numbers for Trunk Steering Codes (TSCs).	16	24
Maximum number of digits per Free Special Number Screening (FSNS) Special Number.	11	19
Total number of digits for screening under Free Special Number Screening (FSNS).	14	22

Maximum number of possible Supplemental Digit Restriction and Recognition (SDRR) entry types.	8	9 ('ALLOW' is added). ALLOW is a new entry type in LD 90. This entry allows a call to go through as if the dialed digits did not match any entry within the Supplemental Digit Restriction and Recognition table.
Restriction imposed on Supplemental Digit Restriction and Recognition (SDRR) entry codes.	Leftwise Unique.	None. The leftwise-unique restriction imposed on SDRR entry codes is removed. For example, if 555 is an existing entry, a new entry of either 55 or 5551212 can be entered.

Summary of Meridian 1 base features enhancements

Table 4 summarizes the changes made to the base Meridian 1 features functionality. Please note that the components that are not affected are not listed.

Table 4 - Summary of Meridian 1 base features changes.

Component	Old	New
Maximum number of digits for an Autodial entry. Note that this enhancement does not apply to M3000 sets.	23	31
For the No Hold Conference functionality, the maximum number of digits for a Conference Autodial target DN entry.	23	31
Maximum number of digits for the Call Forward All Calls DN. Note that this enhancement does not apply to M2317 and M3000 sets.	23	31
Maximum number of digits for the Internal Call Forward DN.	23	31
For the Phantom DN functionality, the maximum number of digits for the Default Call Forward DN.	23	31
Maximum number of digits for the Customer Call Forward DN.	16	23
Maximum number of digits sent in an ANI message.	16	32

Summary of Automatic Call Distribution (ACD) enhancements

Table 5 summarizes the changes made to the ACD functionality.
Please note that the components that are not affected are not listed.

Table 5 - Summary of Meridian 1 ACD changes.

Component	Old	New
Maximum number of digits for the ACD Night Forward DN.	23	31
Maximum number of digits for the ACD Interflow DN.	23	31

Summary of Customer Controlled Routing (CCR) enhancements

Table 6 summarizes the changes made to the Customer Controlled Routing functionality. Please note that the components that are not affected are not listed.

Table 6 - Summary of CCR changes.

Component	Old	New
Maximum number of Termination DN digits in the CCR ITR To-Route-A-Call message.	24	31

Summary of ISDN features enhancements

Table 7 summarizes the changes made to the ISDN functionality.
Please note that the components that are not affected are not listed.

Table 7 - Summary of ISDN changes.

Component	Old	New
For ISDN BRI basic call service line access (BRIL), the maximum number of Called Party Information Element digits.	24	31
For the ISDN QSIG interface, the maximum number of Called Party Information Element digits.	24	31
For the ISDN BRI NI-1 Call Forward All Calls feature, the maximum number of digits for the forward DN.	20	31

Operating parameters

All existing operating parameters that apply to the Meridian 1 ESN functionality, base system features, and ISDN PRI and ISDN BRI networking features apply to the E.164/ESN Numbering Plan Expansion feature.

The enhancements introduced by the E.164/ESN Numbering Plan Expansion feature pertaining to Called Party Information Element digits (CDPN), and forwarded and redirected DNs do not pertain to the M5317 and M5209 ISDN BRI terminals, since these terminals follow the BRI ETSI standard placing a maximum limit of 24 digits on Called Party Information Element digits and redirected DNs.

The 31-digit expansion pertaining to the Call Forward All Calls DN does not apply to Meridian M2317 and M3000 sets, since the their firmware limits entering a CFAC DN from the set to a maximum of 23 and 28 digits, respectively.

An Autodial key cannot be configured on a Meridian M3000 set; instead, the M3000 sets are equipped with a private directory, which allows automatic dialing of a stored DN entry by touching the corresponding name on the set's display screen. Since the firmware of the M3000 limits the length of a DN entry to a maximum of 28 digits, the 31-digit expansion pertaining to the Autodial does not apply to Meridian M3000 sets.

Since the Network Call Trace feature can outpulse a maximum of 21 digits to be printed on the TTY, the 31-digit expansion does not apply to Network Call Trace.

The 16 digit maximum pertaining to the Calling Party Number, Connected Party Number, Redirecting Number, and Redirection Number has not been expanded by the E.164/ESN Numbering Plan Expansion feature.

If all the digits of a DN are dialed automatically, such as for a Speed Call or for any redial feature, only the first 31 digits are processed. This means that any digits that are inserted by, for example, network signaling, pretranslation, or digit manipulation, are counted as part of these 31 digits. Therefore, even fewer than the automatically dialed digits may be processed.

Flexible Feature Codes (FFC) DNs may have a length of 1-7 digits. Call Forward All Calls (CFAC), Internal Call Forward All Calls (ICF), and Remote Call Forward (RCFW) are supported by FFCs, and can be activated, deactivated, and verified using FFCs. When activating CFAC using the Remote Call Forward FFC (RCFA), or when verifying the Call Forward DN using the Call Forward All Call FFC (CFWV), the Remote Call Forward FFC (RCFV), or the Internal Call Forward All Calls FFC (ICFV), the FFC DN is kept, using eight of the available 31 digits. For the CFAC DN or ICF DN, this means that only 23 possible digits can be stored or verified using FFCs. As a result, this limitation does not accommodate the 31 digit CFAC DN and ICF DN expansion introduced by the E.164/ESN Numbering Plan Expansion feature.

Calling Party Privacy (CPP) allows a caller to block his or her name from appearing on the called party display. The call is marked as a CPP call by entering a CPP FFC, up to seven digits long. This means that up to seven additional digits may have to be stored for automatic dialing. These digits are stored in sequence, and subsequent digits may not be processed.

In the case of CPP outpulsing, the CPP outpulsed digits (typically *67 or 1167) are stored after CPP has been activated. If this call goes over a trunk, the CPP outpulsed digits are sent to the far end to indicate that the call is a CPP call. For ISDN calls, a CPP flag is marked in the ISDN message. For non-ISDN CPP calls, digits that are already stored, such as for Call Forward, Autodial, and Speed Call, may be pushed out when the CPP digits are inserted, since only 31 digits can automatically be processed. This means that up to four digits may be removed from the digits that are outpulsed.

The System Access Enhancement (SAE) feature impacts the accepted values for the Call Forward All Calls DN, and the Internal Call Forward DN, when entered in LD 10 and LD 11. This feature allows all values between 4-31 to be accepted, rather than the normal accepted values of 4, 8, 12, 16, 20, 24, 28, 31. Also, the default is 4, rather than 16.

The Called Party Information Elements expansion provided by the E.164/ESN Numbering Plan Expansion feature, applies to ISDN QSIG GF Transport feature.

Feature interactions

The E.164/ESN Numbering Plan Expansion feature does not interact with the Meridian 1 base system features and ISDN PRI and BRI networking features, other than as described in Table 3 to Table 7, and in the operating parameters.

Feature packaging

The E.164/ESN Numbering Plan Expansion feature does not introduce a new package. However, the following packages are required to support the new expansions.

For ESN expansions:

- Basic Alternate Route Selection (BARS) package 57;
- Network Alternate Route Selection (NARS) package 58;
- Flexible Numbering Plan (FNP) package 160.

For ISDN expansions:

- Digit Display (DDSP) package 19;
- Integrated Services Digital Network (ISDN) package 145;
- 1.5 Mbps Primary Rate Access (PRA) package 146;
- Integrated Service Digital Network Signaling Link (ISL) package 147;
- Meridian 1 Extended Peripheral Equipment (XPE) package 203;
- Basic Rate Interface (BRI) package 216;

- Basic Rate Interface Line Application (BRIL) package 235;
- QSIG Interface (QSIG) package 263.

For base system features expansions:

- Optional Features (OPTF) package 1;
- 2500 Telephone Features (SS25) package 18;
- Automatic Call Distribution (ACD) package 40;
- Automatic Call Distribution Advanced (ACD) package 41;
- Automatic Call Distribution Basic (ACD) package 45;
- 500 Telephone Features (SS5) package 73;
- Controlled Class of Service (CCOS) package 81;
- Background Terminal (BGD) package 99;
- Flexible Feature Codes (FFC) package 139;
- Phantom Terminal Numbers (PHTN) package 254.

Feature implementation

The following steps are used to configure the E.164/ESN Numbering Plan Expansion enhancements:

- In LD 10, for analog (500/2500 type) sets, configure the expansion pertaining to the maximum length of Autodial, Call Forward All Calls, Default Call Forward (for Phantom TNs), and Internal Call Forward DN;
- In LD 11, for Meridian 1 proprietary sets, configure the expansion pertaining to the maximum length of Autodial, Conference-Autodial, Call Forward All Calls, and Internal Call Forward DN;
- In LD 12, for attendant consoles, configure the expansion pertaining to the maximum length of the Autodial DN;
- In LD 15, configure the expansion pertaining to the maximum length of the Customer Call Forward DN;
- In LD 23, configure the expansion pertaining to the maximum length of the ACD Night Call Forward DN and the ACD Interflow DN;
- In LD 86, for the ESN data block, configure the expansion pertaining to the maximum number of Digit Manipulation tables, and maximum number of Supplemental Digit Restriction and Recognition blocks;
- In LD 86, for the Digit Manipulation data block, configure the expansion pertaining to the maximum number of leading digits to be deleted and inserted;
- In LD 87, for a Free Special Number Screening Index, configure the expansion pertaining to the maximum number of Special Numbers to be screened;
- In LD 87, for a Trunk Steering Code, configure the expansion pertaining to the maximum number of Flexible Numbers;

- In LD 90, for Network Translation tables, configure the expansion pertaining to the maximum number of Special Numbers digits, the maximum number of digits for Flexible Numbers, the maximum number of Supplemental Digit Restriction and Recognition digits per entry, and the addition of “allow” as a new Supplemental Digit Restriction and Recognition type.

LD 10 — For analog (500/2500 type) sets, configure the expansion pertaining to the Autodial, Call Forward All Calls, Default Call Forward (for Phantom TNs), and Internal Call Forward DN.

Prompt	Response	Description
REQ	NEW, CHG	Add new data, or change existing data.
TYPE	500	Type of telephone set.
TN	c u	Card and unit.
...		
FTR		Special features for telephone sets.
	CFW (4)-31	Enter the maximum number of digits in the Call Forward All Calls DN. Note that there is no default value.
	DCFW II xxx...x	Enter the maximum number of digits in the Default Call Forward DN for a Phantom DN. II = 4,8,12,16,20,24,28,31 (entries are rounded up to the next valid length.) xx...x = the Default Call Forward All Calls DN.
	ICF (4)-31	Enter the maximum number of digits in the Internal Call Forward DN for a Phantom DN.
	...	

LD 11 – For Meridian 1 proprietary sets, configure the expansion pertaining to the Autodial, Call Forward All Calls, Default Call Forward (for Phantom TNs), and Internal Call Forward DN.

Prompt	Response	Description
REQ	NEW, CHG	Add new data, or change existing data.
TYPE	xxxx	Type of telephone set. xxxx = SL1, 2006, 2008, 2009, 2016, 2018, 2112, 2116, 2317, 2616, M3000.
TN	c u	Card and unit.
KEY		Telephone function key assignments.
	nn ADL ll xxx...x	Enter the maximum number of Autodial digits that may be stored. nn = Key number ll = 4,8,12,(16),20,24,28,31,NUL (for M3000 sets, the accepted range is (4)-28) Entries are rounded up to the next valid length. An entry of NUL will disable the Autodial feature xx...x = the Autodial target DN (this is an optional entry.)
	nn CA ll xxx...x	Enter the maximum number of digits that may be stored for the combined Conference-Autodial DN. nn = Key number ll = 4,8,12,(16),20,24,28,31 (entries are rounded up to the next valid length.) xx...x = the Conference-Autodial target DN (this is an optional entry.)
	nn CFW ll xxx...x	Enter the maximum number of digits that may be stored for the Call Forward All Calls DN. nn = Key number ll = (4)-31 (for M2317 and M3000 sets, the accepted range is (4)-23) xx...x = the Call Forward All Calls DN (this is an optional entry.)
	nn ICF ll xx...x	Enter the maximum number of digits that may be stored for the Internal Call Forward DN. nn = Key number ll = (4)-31 xx...x = the Internal Call Forward DN (this is an optional entry.)

LD 12 – For attendant consoles, configure the expansion pertaining to the maximum length of the Autodial DN.

Prompt	Response	Description
REQ	NEW, CHG	Add new data, or change existing data.
TYPE	xxxx	Type of attendant console xxxx = 1250, 2250.
TN	c u	Card and unit.
KEY	nn ADL xxx...x	Attendant console function key assignments. Enter the maximum number of Autodial digits that may be stored. nn = Key number xxx...x = the Autodial DN, up to 31 digits (this is an optional entry.)
	...	

LD 15 - Configure the expansion pertaining to the Customer Call Forward DN.

Prompt	Response	Description
REQ:	NEW, CHG	Add new data, or change existing data.
TYPE	RDR	Redirection data.
CUST	0-31	Customer Number.
...		
- CCFWDN	xxx...x X	Enter the Customer Call Forward DN, up to 23 digits (this entry is made for a new CCFWDN, or if the length of an existing CCFWDN has been expanded.) Enter X for no entry.
...		

LD 23 - Configure the expansion pertaining to the ACD Night Call Forward DN and the ACD Interflow DN.

Prompt	Response	Description
REQ	NEW, CHG	Add new data, or change existing data.
TYPE	RDR	Call Detail Recording data.
CUST	0-31	Customer Number.
ACDN	xxx...x	ACD DN.
...		
NCFW	xxx...x	Enter the ACD Night Forward DN, up to 31 digits (this entry is made for a new Night Forward DN, or if the length of an existing Night Forward DN has been expanded.)
...		
IFDN	xxx...x	Enter the ACD Interflow DN, up to 31 digits (this entry is made for a new Interflow DN, or if the length of an existing Interflow DN has been expanded.)

LD 86 - For the ESN data block, configure the expansion pertaining to the maximum number of Supplemental Digit Restriction and Recognition blocks, and the maximum number of Digit Manipulation tables.

Prompt	Response	Description
REQ	NEW, CHG	Add new data, or change existing data.
CUST	0-31	Customer Number.
FEAT	ESN	ESN data block feature.
...		
MXSD	(0)-1500	Enter the maximum number of Supplemental Digit Restriction and Recognition (SDRR) blocks, for BARS or NARS. Enter 0 (the default) if no SDRR blocks are required.
...		

MXDM	(0)-1000 (0)-256 (0)-32	Enter the maximum number of Digit Manipulation tables. (0)-1000 = for Flexible Numbering Plan (0)-256 = for BARS/NARS (0)-32 = for Coordinated Dialing Plan Enter 0 (the default) if no Digit Manipulation tables are required.
...		

LD 86 - For the Digit Manipulation data block, configure the expansion pertaining to the maximum number of leading digits to be deleted and inserted.

Prompt	Response	Description
REQ	NEW, CHG	Add new data, or change existing data.
CUST	0-31	Customer Number.
FEAT	DGT	Digit Manipulation data block feature.
...		
DMI	1-999 1-255 1-31	Enter the Digit Manipulation table. 1-999 = for Flexible Numbering Plan 1-255 = for BARS/NARS 1-31 = for Coordinated Dialing Plan. The maximum number of Digit Manipulation tables is defined using prompt MXDM, in the ESN data block.
DEL	(0)-19	Enter the number of leading digits to be deleted. Enter 0 (the default) for none.
INST	x...x x...x*y...y X	Enter the number of leading digits to be inserted. x...x = 1-31 x...x*y...y = for Special Common Carriers (SCCs), 1-30, including access number (x...x), delimiter (*), and authorization code (y...y) Enter X for none.
...		

LD 87 - For a Free Special Number Screening Index, configure the expansion pertaining to the maximum number of Special Numbers to be screened.

Prompt	Response	Description
REQ	NEW, CHG	Add new data, or change existing data.
CUST	0-31	Customer Number.
FEAT	FSNS	Free Special Number Screening.
FSNI	1-255	Free Special Number Screening Index.
SPN	1-19	Special Number to be screened.
...		

LD 87 - For a Trunk Steering Code, configure the expansion pertaining to the maximum number of Flexible Numbers.

Prompt	Response	Description
REQ	NEW, CHG	Add new data, or change existing data.
CUST	0-31	Customer Number.
FEAT	CDP	Coordinated Dialing Plan.
TYPE	TSC	Trunk Steering Code.
TSC	1-7	Trunk Steering Code.
- FLEN	0-24	Flexible Number.
...		

LD 90 - For Network Translation tables, configure the expansion pertaining to the maximum number of Special Numbers digits, the maximum number of digits for Flexible Numbers, the maximum number of Supplemental Digit Restriction and Recognition digits per entry, and the addition of “allow” (ALOW) as a new Supplemental Digit Restriction and Recognition type.

Prompt	Response	Description
REQ	NEW, CHG	Add new data, or change existing data.
CUST	0-31	Customer Number.
FEAT	NET	Network Translation Tables data.
...		
TYPE	SPN	Special Number Translation.
SPN	xxxx xxxx x...x	Enter the Special Number Translation digits. Up to 19 digits may be entered. The SPN digits must be entered in groups of at most four digits, separated by a space. Up to five groups can be entered. The restriction is removed of allowing one less digit if the first digit of a digit string is not “1”.
- FLEN	(0)-24	Enter the number of Flexible Digits (the number of digits that the system expects to receive before accessing a trunk, and outpulsing the digits.)
...		
- SDRR	DENY LDID LDDD DID DDD ITED ARRN STRK ALOW	Type of Supplemental Digit Restriction and Recognition. DENY = restricted codes LDID = recognized local DID codes LDDD = recognized local DDD codes DID = recognize remote DID codes DDD = recognize remote DDD codes ITED = incoming trunk group exclusion digits ARRN = alternate routing remote number STRK = allowed codes for ADM/MDM ALOW = allowed codes

		The maximum number of digits entered in response to the DENY, LDID, LDDD, DID, DDD, and ALLOW prompts, which follow, must be lesser than 10, or 7-m (8-m for 1+ dialing) for Central Office translation data (NXX), 10-m (11-m for 1+ dialing) for Numbering Plan Area Code translation data (NPA), or 19-m for Special Numbers Translation data (SPN), where m = the number of digits entered for the prompt NXX, NPA, or SPN. These numbers are no longer required to be leftwise unique. For non leftwise unique numbers, the longer number takes precedence over the shorter number. However, the exact same numbers (non leftwise unique and the same length) are still blocked.
- - DENY	x...x	Restricted number to be denied.
- - LDID	x...x	Local DID number to be recognized.
- - LDDD	x...x	Local DDD number to be recognized.
- - DID	x...x	Remote DID number to be recognized.
- - DDD	x...x	Remote DDD number to be recognized.
- - ALLOW	x...x	Code to be allowed.

Feature Operation

No specific operating procedures are required to use this feature.

Electronic Lock Network Wide/Electronic Lock on Private Lines

The basic Electronic Lock feature has been enhanced to provide the following capabilities:

- The feature can be implemented network wide.
- The capability to define (for the locked sets), on a per customer basis, a Controlled Network Class of Service (CNCS) different from the Network Class of Service (NCOS), which is defined on a per set basis.
- Locking can be implemented for Private DNs.

In a Meridian Customer Defined Network (MCDN) environment, Electronic Lock Network Wide can be used to change the Class of Service of a set in a remote location. Electronic Lock Network Wide is activated or deactivated from any node by dialing the Electronic Lock Flexible Feature Code (FFC), the password, and the DN of the set to be changed. Since the password length defined at the destination node is not known at the originating node, the Station Control Password (SCPW) length (defined in LD 15) must be defined the same for all network nodes.

If the originating node has the FFC Confirmation Tone option selected, a confirmation tone is given when the feature is successfully activated or deactivated. Overflow tone is given if the operation is unsuccessful. There is no FFC verify code for Electronic Lock.

When a locked set makes an outgoing trunk call, if Controlled Network Class of Service is defined, the Network Class of Service (NCOS) defined by CNCS is used instead of the NCOS defined in LD 10 or 11 for the set. If network signaling is configured for the trunk that normally transmits the NCOS of the set between Electronic Switched Network (ESN) nodes, the CNCS is transmitted instead of the NCOS. This prevents a locked set from reaching the exchange network by tandeming through a TIE trunk using ESN.

A new prompt (PELK) is introduced in the Customer Data Block to implement Electronic Lock on private lines. If this option is enabled, an outgoing call on a private line of a locked set is subject to the same restrictions as all other DNs on the set. The same intercept treatment would be given as for a regular DN. The restrictions for private lines, as well as other DN keys on the set, are controlled by the Controlled Class of Service (CCOS), and by the CNCS if defined. Therefore, for outgoing calls, the Class of Service restrictions and/or New Flexible Code Restriction (NFCR) apply to private line keys on locked sets. Only outgoing calls are affected. The Class of Service of a non-locked set has no effect on private lines.

Operating parameters

The Network Dialing Plan must be either a Coordinated Dialing Plan (CDP) or a Uniform Dialing Plan (UDP).

The set password lengths must be equal for all nodes in the network.

Network wide operation is only supported through an MCDN ISDN network.

The Electronic Lock feature must be equipped on both originating and remote nodes.

The FFC used is defined on the node from which Network Electronic Lock is being activated. To activate or deactivate Network Electronic Lock from any remote node, the user has to use the FFC Electronic Lock Activate (ELKA) or Electronic Lock Deactivate (ELKD) code defined on that remote node.

ISDN Basic Rate Interface (BRI) sets cannot be used to lock another set, nor can they be locked themselves.

An analog (500/2500 type) telephone with a private line DN or a Meridian Digital Telephone set with a private line on the Prime DN cannot be locked.

The following hardware is required:

- Primary Rate Interface – D-channel Handler Interface (DCHI)/ Multipurpose Serial Data Link (MSDL) and PRI/PRI2 cards.

- Integrated Services Digital Network Signaling Link (ISL) – DCHI cards and TIE trunks.
- Virtual Network Services (VNS) – DCHI cards and any trunks.

Feature interactions

Automatic Call Distribution (ACD)

An ACD set cannot be locked.

Call Forward (CFW)

Call Forward No Answer (CFNA)

For Call Forwarding, the COS and NCOS used for the forwarding call can be taken from either the forwarding set or from the forwarded set, depending on the option defined in the Customer Data Block.

For example, set B call forwards all calls to an external trunk. Set A calls set B. If OPT = CFF in LD 15 (Call Forward forwarded to party's COS and NCOS), the COS and NCOS of set B are used for forwarding the call to the trunk. If OPT = CFO (Call Forward originating party's COS and NCOS), the COS and NCOS of set A are used for forwarding the call to the trunk.

Direct Inward System Access (DISA)

The Electronic Lock feature cannot be activated or deactivated when accessing the node through DISA.

Electronic Switched Network Authcode

If a station user enters an authcode on the set, regardless of the status of the set being locked or not, the NCOS defined for the authcode is used. The ESN Authcode feature overrides the Electronic Lock Network Wide feature.

Flexible Numbering Plan

If a network is equipped with a flexible numbering plan (i.e., not all the network DNs are the same length), hanging up before the usual end-of-dialing timeout cancels the request for activation or deactivation of Electronic Lock. Dialing an octothorpe (#) after the network DN will cause the request for activation or deactivation of the Electronic Lock to be sent immediately, instead of waiting for the usual end-of-dialing timeout to send it.

Multiple Appearance DN

The same locked or unlocked state applies to all Terminal Numbers with the same primary DN and the same SCPW. Terminal Numbers with the same DN, but not having the same SCPW, cannot be locked or unlocked.

New Flexible Code Restriction (NFCR)

With NFCR, toll denied stations are allowed or denied calling privileges according to the Facility Restriction Level (FRL) assigned to the NCOS defined in the protected line block. For a locked set, NCFR uses the FRL assigned to the CNCS to determine its calling privileges if one is defined; if no CNCS is defined, the NCOS of the locked set will be used.

Scheduled Access Restrictions (SAR)

The SAR feature overrides Electronic Lock.

Virtual Network Services (VNS)

Electronic Lock can function in a VNS environment.

Feature packaging

Electronic Lock Network Wide/Electronic Lock on Private Lines is packaged under Flexible Feature Codes (FFC) package 139.

Use of this feature requires the following additional packages:

- Controlled Class of Service (CCOS) package 81
- Network Class of Service (NCOS) package 32, and
- Integrated Services Digital Network (ISDN) package 145.

Feature implementation**Electronic Lock Network Wide**

Use the following overlays to implement Electronic Lock Network Wide.

LD 15 – Modify Customer Data Block for Controlled Class of Service data as follows

Prompt	Response	Description
REQ:	CHG	Change existing data block.
TYPE:	CCS_DATA	Controlled Class of Service data.
CUST	0-31	Customer number.
- CCRS	aaa	Controlled class of service (CCOS) Restricted Service.
- ECC1	aaa	Enhanced Controlled Class of Service level 1.
- ECC2	aaa	Enhanced Controlled Class of Service level 2.
- CNCS	0-99	Network Controlled Class Of Service for Electronic Lock.
- PELK	YES (NO)	Enter YES for Electronic Lock on a private line; otherwise, enter NO.

LD 15 – Modify Customer Data Block for Flexible Feature Code data as follows:

Prompt	Response	Description
REQ:	CHG	Change existing data block.
TYPE:	FFC_DATA	Flexible Feature Code data.
CUST	0-31	Customer number.
- CCRS	aaa	Controlled class of service (CCOS) Restricted Service.
- SCPL	0-8	Station Control Password Length.
- SBUP	(YES) NO	Enable use of station control passwords for set based administration user level access

- - PWD2	xxxx	PWD2 password for confirmation
- FFCS	(NO) YES	Change Flexible Feature Code end-of-dialing indicator
- - STRL	1-3	String Length of end-of-dial indicator
- - STRG	xxx	String to indicate end-of-dialing
- ADLD	(0)-20	Auto Dial Delay in seconds
- SCPL	0-8	Station Control Password Length

LD 10 – Set the Station Control Password and Controlled Class of Service Allowed for each analog (500/2500 type) telephone.

Prompt	Response	Description
REQ	NEW,CHG	Add, Change.
TYPE	500	Telephone type.
CUST	0-31	Customer Number.
TN	c u	Card, and unit (Option 11).
SCPW	xxxxxxxx	Station Control Password (1 to 8 digits, as defined in LD 15).
CLS	CCSA	Controlled Class of Service Allowed.

LD 11 – Set the Station Control Password and Controlled Class of Service Allowed for each Meridian 1 proprietary telephone.

Prompt	Response	Description
REQ	NEW,CHG	Add, Change.
TYPE	aaaa	Telephone type, where aaaa = SL1, 2006, 2008, 2009, 2016, 2018, 2112, 2216, 2317, 2616, or 3000.
CUST	0-31	Customer Number.
TN	c u	Card, and unit (Option 11).
SCPW	xxxxxxxx	Station Control Password (1 to 8 digits, as defined in LD 15).

CLS	CCSA	Controlled Class of Service Allowed.
-----	------	--------------------------------------

LD 57 – Configure the Flexible Feature Codes for Electronic Lock.

Prompt	Response	Description
REQ	NEW/CHG	Enter new/change data.
TYPE	FFC	Flexible Feature Codes.
CUST	0-31	Customer Number.
FFCT	YES	Provide FFC confirmation tone.
CODE	ELKA	New/change Electronic Lock Activate FFC.
ELKA	xxxx	Enter the new or changed Electronic Lock Activate FFC
ELKA	<cr>	
CODE	ELKD	New/change Electronic Lock Deactivate FFC.
ELKD	xxxx	Enter the new or changed Electronic Lock Deactivate FFC
ELKD	<cr>	

LD 87 – In the ESN 2 overlay, define all NCOS to be used.

Prompt	Response	Description
REQ	NEW/CHG	Enter new/change data.
CUST	0-31	Customer Number.
FEAT	NCTL	Network Control.
...		
NRNG	0-99	NCOS range.
NCOS	0-99	Network Class of Service group number.
...		
– FRL	(0)-7	Facility Restriction level.

Electronic Lock on Private Lines

Use the following overlays to implement Electronic Lock Network on Private Lines.

LD 15 – Modify Customer Data Block for Controlled Class of Service data as follows

Prompt	Response	Description
REQ:	CHG	Change existing data block.
TYPE:	CCS_DATA	Controlled Class of Service data.
CUST	0-31	Customer number.
- CCRS	aaa	Controlled class of service (CCOS) Restricted Service.
- ECC1	aaa	Enhanced Controlled Class of Service level 1.
- ECC2	aaa	Enhanced Controlled Class of Service level 2.
- CNCS	0-99	Network Controlled Class Of Service for Electronic Lock.
- PELK	YES	Electronic Lock on Private Lines.

LD 15 – Modify Customer Data Block for Flexible Feature Code data as follows

Prompt	Response	Description
REQ:	CHG	Change existing data block.
TYPE:	FFC_DATA	Flexible Feature Code data.
CUST	0-31	Customer number.
- CCRS	aaa	Controlled class of service (CCOS) Restricted Service.
- SCPL	0-8	Station Control Password Length.
- SBUP	(YES) NO	Enable use of station control passwords for set based administration user level access
- - PWD2	xxxx	PWD2 password for confirmation

- FFCS	(NO) YES	Change Flexible Feature Code end-of-dialing indicator
-- STRL	1-3	String Length of end-of-dial indicator
-- STRG	xxx	String to indicate end-of-dialing
- ADLD	(0)-20	Auto Dial Delay in seconds
- SCPL	0-8	Station Control Password Length

LD 16 – Set the Facility Restriction Level (FRL) number and the New Flexible Code Restriction (NFCR) tree number for private lines.

Prompt	Response	Description
REQ	CHG	Change.
TYPE	RDB	Route Data Block.
...		
PRIV	YES	Private Line Route.
...		
FRL	0-7 0-254	Facility Restriction Level (FRL) and New Flexible Code Restriction (NFCR) tree number.

LD 10 – Set the Station Control Password and Controlled Class of Service Allowed for each analog (500/2500 type) telephone.

Prompt	Response	Description
REQ	NEW,CHG	Add, Change.
TYPE	500	Telephone type.
CUST	0-31	Customer number.
TN	c u	Card, and unit (Option 11).
SCPW	xxxxxxxx	Station Control Password (1 to 8 digits, as defined in LD 15).
CLS	CCSA	Controlled Class of Service Allowed.

LD 11 – Set the Station Control Password and Controlled Class of Service Allowed for each Meridian 1 proprietary telephone.

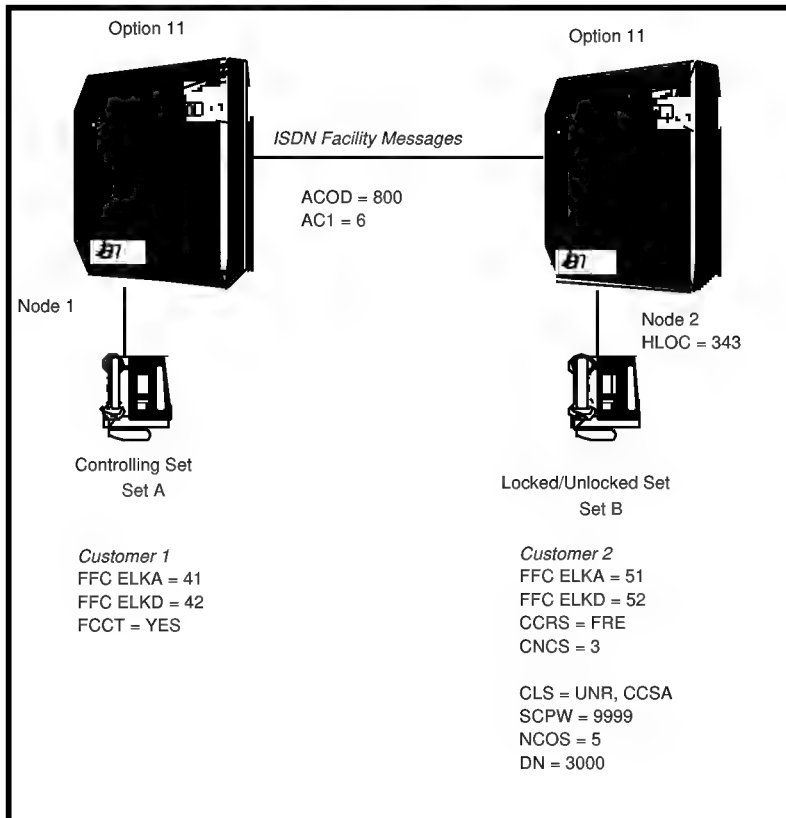
Prompt	Response	Description
REQ	NEW,CHG	Add, Change.
CUST	0-31	Customer number.
TYPE	aaaa	Telephone type, where aaaa = SL1, 2006, 2008, 2009, 2016, 2018, 2112, 2216, 2317, 2616, or 3000.
TN	c u	Card, and unit (Option 11).
SCPW	xxxxxxxx	Station Control Password (1 to 8 digits, as defined in LD 15).
CLS	CCSA	Controlled Class of Service Allowed.
...		
KEY	xx PVR yyyy(yyy)	Key number and DN for Private Line Ringing, where xx = the key number and yyyy(yyy) = the Private Line Ringing DN (up to four digits; up to seven digits if the Directory Number Expansion (DNXP) package 150 is equipped). Private Line Directory Number (PRDN) must be defined in LD 14.

Feature operation

Electronic Lock Network Wide

In this example, an MCDN ISDN network is set up connecting Node 1 to Node 2. Set A is the Controlling set. Set B is the set to be locked and unlocked by Set A. The digits that set A would dial to ring set B are to be in the format of a CDP or UDP dialing plan. This is standard dialing for ISDN features.

Figure 9- Network Electronic Lock



To lock set B (in Node 1) from set A (in Node 2), the user goes off-hook and dials the Electronic Lock Activate (ELKA) FFC defined in the Customer Data Block of Node 1, followed by the Station Password (SCPW) defined for set B, and the digits that set A would normally dial to ring set B (e.g., 41 + 9999 + 6-343-3000). If the FFCT option is configured as YES in LD 57 in the Customer Data Block of Node 1, confirmation tone is given to set A to confirm that the lock operation has been successful. Set B becomes locked if it was previously in an unlocked state.

If Set B was already locked, the above operation is ignored and Set B remains locked; however, a confirmation tone is provided to verify that the set is locked.

If the lock operation was unsuccessful, overflow tone is given.

To unlock set B (in Node 1) from set A (in Node 2), the user goes off-hook and dials the Electronic Lock Deactivate (ELKD) FFC defined in the Customer Data Block of Node 1, followed by the SCPW defined for set B and the digits that set A would normally dial to ring set B (e.g., 42 + 9999 + 6-343-3000). If the FFCT option is configured as YES in LD 57 in the Customer Data Block of Node 1, confirmation tone is given to set A to confirm that the unlock operation has been successful. Set B becomes unlocked if it was previously in a locked state.

If Set B was already unlocked, the above operation is ignored and Station B remains unlocked; however, a confirmation tone is provided to verify that the set is unlocked.

If the unlock operation was unsuccessful, overflow tone is given.

Electronic Lock on Private Lines

Feature operation of Electronic Lock for Private Lines is the same as for the basic Electronic Lock feature.

Controlled Network Class of Service

No specific operating instructions are required to use Controlled Network Class of Service.

Emergency Services Access

Purpose of this overview

The purpose of this overview is to provide a synopsis of the Emergency Services Access (ESA) feature description. For complete information on ESA, please refer to *Emergency Services Access Feature Description and Administration* (553-3001-313).

Emergency Services Access feature overview

Emergency Services Access (ESA) is a totally new feature that places a customer in compliance with new federal legislation that requires the Private 911 type of functionality provided by ESA. Please note, however, that the ESA feature is also generally useful for users who are not subject to legislation, and is broad enough to be used in different countries. For example, it will be appreciated by any customer who wants to route emergency calls in a special manner, or who wants to be notified when a telephone user makes an emergency call. It would also appeal to a customer who wishes to have ESA calls answered on-site, on the business premises, rather than being forwarded to the Public Services Answering Point (PSAP).

The focus of the Emergency Services Access (ESA) feature is to provide the following capabilities:

- A special ESA Directory Number access (such as 911) can be defined to access emergency services. This number can be dialed without having to first dial an ESN access code.
- The Meridian 1 recognizes that the dialed ESN DN is an emergency call, and provides special treatment.
- Route the call to special trunks designated to handle ESA calls (either dedicated to handle only ESA calls, or shared to handle other types of calls as well).
- Provide flexible Automatic Numbering Identification (ANI) number translation for non-DID numbers (and for DID numbers, if desired by the customer).
- Send out the ANI of the station with the call, so that the PSAP can use it to determine the caller's location.

- Support a networking environment, that is, where the ESA call is originated on one node, and then routed across the network to another node for onward routing into the Public Network and the PSAP.
- Provide On-site Notification, so that the customer's staff knows that an ESA call is in progress.

There are four major components of ESA that provide the functionality described above.

With 'ESA Call Recognition' an Emergency Services Access DN (such as 911) can be configured on the Meridian 1. When a caller dials the ESA DN (there is no need to first dial an Access Code), the Meridian 1 automatically recognizes the call as an Emergency Services Access call and sets up special treatment.

With 'ESA Call Routing' outgoing trunk routes may be designated to handle ESA calls.

With 'ESA Calling Terminal Identification' the Meridian 1 composes an ESA calling number for outgoing ESA calls.

With 'On Site Notification' a Meridian 1 output device (such as a terminal or a set) may be configured to provide an on-site alerting capability for ESA calls. The last two capabilities allow emergency and security personnel to respond more promptly in the event of an ESA call.

Packaging

ESA is comprised of three different packages, which must be implemented separately depending on the functionality that a customer desires (as outlined in the Feature implementation section on page 154).

The Emergency Services Access (ESA) package 329 provides ESA Call Recognition, ESA Call Termination Identification, and ESA Call Routing. It also provides basic number translation, such as the addition of NXX and NPA (area and office) codes, but not non-DID to DID translation (this is provided by the ESA_CLMP package). The ESA_SUPP package provides supplementary capabilities, such as networking capabilities (for example, incoming ISDN to CAMA number conversions), and On Site Notification. The ESA_CLMP package provides translation of non-DID to DID numbers.

System configurations

The most common Meridian 1 system configurations that are possible with ESA are as follows:

- non-networking, handling DID ESA calls or non-DID ESA calls
- networking configuration, handling ESA calls for the following scenarios:
 - Non-ISDN network, originating node is non-Meridian 1
 - Non-ISDN network, originating node is a Meridian 1
 - ISDN network, originating node is non-Meridian 1
 - ISDN network, originating node is a Meridian 1
- standalone configuration (on-site call answering). A standalone configuration is one where ESA calls are answered on the business premises, rather than being forwarded to the PSAP. The calls, however, may then be redirected to the PSAP, if required.

Feature implementation

The following steps are required to implement ESA:

- 1 Modify the customer CLID database to allow ESA calling number composition, using Overlay 15.
- 2 Configure CLID entries for non-ISDN routes, so that when an incoming non-ISDN trunk initiates a tandem ESA call, the ESA Calling Terminal Identification function will compose an ESA calling number to identify the incoming trunk. This is done using Overlay 16.

- 3 Configure a CLID entry for analog (500/2500 type) sets, Meridian 1 proprietary sets, and Basic Rate Interface (BRI) sets, using Overlays 10, 11, and 27 respectively.
- 4 Configure OSN Notification data:
 - Configure an OSN output device using Overlay 17.
 - Configure an OSN set using Overlay 11.
 - Configure terminal designator (DES) data for (500/2500 type) sets, Meridian 1 proprietary sets, and BRI sets, using Overlays 10, 11, and 27 respectively.
- 5 Configure ESA:
 - Configure ESA data using Overlay 24.
 - Configure ESA route data using Overlay 16.
 - If BARS/NARS is used, configure ESA digit manipulation and call routing using Overlay 86, and ESA call recognition using Overlay 90. This is to allow Access Code + Emergency Services Directory Number (ESDN) dialing to be recognized and treated as an ESA call.

Error Handling on ISDN Signaling Link Analog E&M TIE Trunks

The Integrated Services Digital Network Signaling Link (ISL) Analog E&M TIE Trunks feature identifies error conditions that are generated by external equipment and ensures that faulty trunks cannot be used. When the error condition is removed the trunk is put back into service.

When an error condition is identified while the trunk is idle, the trunk is put into a maintenance busy mode and a trunk error message is printed. If an error occurs while a call is being sent, an error message is printed and the call proceeds; the trunk unit is put into maintenance busy mode after the call is disconnected. Outgoing calls cannot be made on units that are in maintenance busy and incoming calls are rejected.

Once the external equipment removes the error condition, a message is printed and a restart message is sent on the D-channel to indicate that the unit is usable.

Operating parameters

Error Handling on ISL Analog E&M TIE Trunks only functions on ISL Analog E&M TIE Trunks and not on other types of ISL TIE trunks. This function only operates when the D-channel is established.

E&M types applicable to this feature include two-wire and four-wire with TY1 and TY2 signaling types. The feature applies to immediate start, delay dial start and wink start arrangement types.

This feature is designed to operate only when ISL E&M TIE trunks are used in conjunction with transmission equipment.

To implement Error Handling on ISL Analog E&M TIE trunks the FALT prompt response in the Route Data Block (LD 16) must be YES. If FALT=NO, then no error handling will occur on the route.

Feature interactions

There are no interactions with other features.

Feature packaging

Error Handling on ISL Analog E&M Tie Trunks is ISDN Signaling Link (ISL) is package 147 and is included in ISDN Signaling (ISDN) package 145.

Feature implementation

LD 16 – Configure ISL on Analog Trunks.

Prompt	Response	Description
REQ	NEW, CHG	Add, or change.
TYPE	RDB	Route data block.
...		
DTRK	NO	Digital trunk route.

ISDN	YES	ISDN Primary Rate Interface option.
MODE	ISLD	Mode of D-channel controlling the route.
...		
FALT	YES	Enables the error handling and recognition of E lead error for ISL E&M Tie Trunks. If FALT= NO, then no error handling with occur.

Feature operation

Overlay Changes

The enabling/disabling commands in the maintenance overlay is changed so that if the trunk unit is in error state the following occurs:

- The trunk unit cannot be enabled until the external error condition is removed. The message TRK533 is printed to warn the user that the enable command is cancelled because an error exists on the ISL E&M TIE Trunks. When this occurs, the trunk unit will remain in maintenance busy mode.

These overlay changes ensure that error states on both sides of the link are not affected by enabling/disabling the unit.

Error Applied to Unit

- An error condition can be generated by the external equipment when a unit is idle, during call setup or when a call is established.

Error applied. Unit Idle

- If an error is detected the unit is put in maintenance busy mode and the error message TRK531 is printed.

Error applied. Call Setup

- If an error is detected during call setup the error message TRK531 is printed.
- After the call is disconnected, the trunk is put into maintenance busy mode.

Error applied. Call Established

When an error is applied while a call is established, it is detected after the call is disconnected. If the release message is not received within the time defined by the supervision timer then the E lead remains grounded and causes an error condition. The following occurs:

- The unit is put into maintenance busy mode and the error message TRK531 is printed.

Error State

When the unit is in an error state then it is not available for incoming or outgoing calls. The error state is maintained until it is cleared by external equipment.

Outgoing Calls

Normal call processing selects the next available channel for outgoing calls.

Incoming Calls

Far end attempts to make calls will send a SETUP message. If the unit is in an error state, a Release Complete message is sent. The far end trunk will be put into a LOCKOUT state.

Restart Message

During an error state, a RESTART message is received from the far end. This message is ignored so that the error state of the unit is preserved.

Error Removed

If the error condition is removed by external equipment, the trunk is marked IDLE, the error message TRK532 is printed and a RESTART One Channel message is sent on the D-channel. The far end trunk unit changes from LOCKOUT to IDLE state.

No specific operating procedures are required to use this feature, however the following system messages will occur throughout feature operation.

Message Number	Events
TRK531 tn	An error has been detected on ISL E&M TIE, unit will be put to Maintenance Busy.
TRK532 tn	Error Condition on ISL E&M TIE removed.
TRK533 tn	Enable command is cancelled on this unit because an error exists on the ISL E&M TIE trunks.

ESN on PRI/ISL

Most Electronic Switched Network (ESN) services are available over a DTI or PRI network, with the following exceptions:

- Network Call Transfer (NXFER)
- Coordinated Call Back Queuing (CCBQ)
- CBQ to Conventional Main (CBQCM)
- Off-Hook Queuing (OHQ)

Note: The above exceptions are based on Generic X11 release 16.

Network Class of Service (NCOS) is part of the ESN feature, and allows control of the following:

- User access to routes
- Eligibility of queuing for a user
- Eligibility for a user to receive Expensive Route Warning Tone (ERWT)
- Eligibility to access Network Speed Call (NSC)

An NCOS is assigned to every user on the Meridian 1/SL-1 system. Depending on the NCOS assigned, users are either allowed or denied to place local, long distance and/or International calls. During a tandem call, DTI/PRI sends the NCOS of the user across the DTI/PRI link as a prefix to the dialed number. This allows network access control to be based on a consistent set of NCOSs for calls originating anywhere on the network.

Northern Telecom's ISDN/PRI networking feature development is based on Network Automatic Route Selection (NARS) and/or Coordinated Dialing Plan (CDP). The NARS feature distinguishes between private and public network calls using the first 2 to 3 digits dialed. This digit processing allows a NARS switch to process the call immediately upon dialing the last digit and thus results in instantaneous sending of the call setup message.

CDP uses Distant Steering Codes (DSC) and Trunk Steering Codes (TSC). DSC codes are recognized in software and also provide instantaneous cut-through. However, TSC and the number that follows varies in length, therefore end of dialing timers are used.

ISDN with CDP or NARS provides the exact display of the CLID across the network. However, when some switches use CDP and the others use NARS, the correct display of the CLID may not make sense. The NARS switches will be sending the location code plus the extension number, whereas the CDP switches will be sending only the CDP number. In some networks, the CDP number does not contain enough information to be able to dial back the calling number if necessary.

Option 148 (Advanced Network Features) provides Network Ring Again (NRAG). Because of NRAG and other features (NACD, NMS, TRO) planned in future X11 software releases, and the complexity of inserting and deleting digits in the number dialed in an all CDP or NARS or combination CDP/NARS network, Northern Telecom requires that every switch in the network be equipped with either NARS or CDP software.

With the CDP Expansion enhancement, X11 Release 15 and later ISDN networks may now support a 3 to 10 digit Coordinated Dialing Plan (CDP). Prior to X11 Release 15, a 3 to 6 digit ISDN CDP was supported.

The Automatic Insertion of ESN Access Codes feature (INAC) provides greater flexibility in designing network numbering plans. This enhancement allows either AC1 or AC2 to be used as the access code for private network and long distance calls. Previously, only AC1 could be used for these types of calls. Advanced Networking Features such as NACD and NMS require that INAC be implemented, rather than using Digit Manipulation Tables to insert the appropriate ESN Access Code.

Package Requirements

ESN on PRI/ISL requires the following:

ISDN	option 145
PRI	option 146 or ISL option 147
NARS	option 58 and/or CDP option 59 and NSIG option 37 (or Multi-Site 1 or 2)

Flexible Night Service

Night Service can only be used via the customer data block since there is no NITE prompt in the ISDN ISA trunk data block. See the ISA Feature Description earlier in this chapter.

Flexible Numbering Plan Enhancement

The Flexible Numbering Plan Enhancement (FPE) allows the Flexible Numbering Plan (FNP) feature to be enabled/disabled through service change at a Customer level. FNP is enabled/disabled in Overlay 15 by defining the FNP prompt.

Operating parameters

All operating parameters that apply to the existing FNP feature also apply to the FNP Enhancement.

Feature interactions

Flexible Numbering Plan

The Flexible Numbering Plan Enhancement does not change the functionality of the FNP feature.

Vacant Number Routing

Vacant Number Routing (VNR) is available only when FNP is enabled (FNP = YES). Therefore, VNR is only prompted in Overlay 15 when FNP = YES. When FNP is disabled, VNR is also disabled.

Feature packaging

The Flexible Numbering Plan Enhancement feature requires Flexible Numbering Plan (FNP) package 160, which depends on Network Alternate Route Selection (NARS) package 58.

Feature implementation**LD 15** – Enable/disable the Flexible Numbering Plan feature.

Prompt	Response	Description
REQ:	CHG	Change existing data.
TYPE:	NET	Networking data.
CUST	xx	Customer number.
...		
AC2	NPA NXX INTL SPN LOC	Access Code 2. E.164 National E.164 Subscriber International Special Number Location Code
FNP	YES	Enable the Flexible Numbering Plan feature (default).
ISDN	(NO) YES	ISDN option.
...		
VNR	(NO) YES	Vacant Number Routing enabled (disabled). VNR is only prompted when FNP = YES. When FNP = NO, VNR is automatically set to NO and is, therefore, restricted.
- RLI	0-999	Route List Index. Enter the route list, defined in LD 86, to be used by Vacant Number Routing.
- FLEN	1-(16)	Flexible length of digits expected.
- CDPL	1-(10)	Coordinated Dialing Plan Length. Enter the maximum number of Coordinated Dialing Plan (CDP) digits expected by Vacant Number Routing.
- LOCL	1-(10)	Location Code Length. Enter the maximum number of Location (LOC) digits expected by Vacant Number Routing.

Feature operation

No specific operating procedures are required to use this feature.

Idle Extension Notification

This feature provides the attendant with the ability to be notified when a busy extension becomes idle. A typical application of this feature is in the case of the attendant wanting to leave an urgent message to someone who is on their extension, but does not want to break-in to their call.

The Idle Extension Notification feature is not supported on ACD DN's.

- An Idle Extension Notification call cannot be placed on hold by the attendant. If the attendant attempts to place an Idle Extension Notification call on hold before the Release key is pressed, the Idle Extension Notification request is canceled and the call is disconnected. An answered Idle Extension Notification recall cannot be placed on hold until after the SACP key is pressed to ring the extension.
- When an attendant has requested an Idle Extension Notification, it can be canceled by then pressing the Position Busy key. This will also cancel all other Idle Extension Notification requests.
- Idle Extension Notification and pre-dial Break-In are mutually exclusive. It is possible to press the Break-In key, the DN of a busy extension (to override call forward, for example), and then press the SACP key to request Idle Extension Notification. While the SACP lamp is lit, it is not possible to press the Break-In key to complete the Break-In. Conversely, if a Break-In conference is underway, it is not possible to activate Idle Extension Notification by pressing the SACP key.

If the SACP lamp is lit during the pre-dial Break-In sequence, the only available possibilities are: to press the Release key to request for Idle Extension Notification; to press the SACP key again to remove the request; or to press the Release SRC key to release the source without requesting Idle Extension Notification. If the

Idle Extension Notification request is removed by pressing the SACP key a second time (or due to any other limitation of Idle Extension Notification), Break-In is then possible.

It is not possible to do a Post-Dial Break-In on the source side of the attendant, therefore it is not possible to request for Idle Extension Notification in conjunction with Post-Dial Break-In. This means that it is not possible to a Break-In after an Idle Extension Notification recall is answered if the wanted extension becomes busy again.

- When an extension that is being supervised for an Idle Extension Notification to the attendant becomes idle, it is kept busy from receiving any incoming calls. The lamp on the attendant console for that DN will display a busy status, according to the parameters of the Busy Lamp Field/Enhanced Busy Lamp Field feature.
- It is not possible to request for Idle Extension Notification if the Busy Verify feature has been activated after the Busy Verify key is pressed.
- When an extension that is being supervised for Idle Extension Notification becomes idle, it has the ability to make outgoing calls. If Call Forward All Calls or Intercept Call Forward are activated at the extension before the attendant presses the SACP key to ring that extension, the attendant's call will be forwarded to the Call Forward destination. The attendant display will show both the call forward DN as well as the original extension's DN.

If the Call Forward DN is busy, SACP can be activated towards the Call Forward DN, if all the requirements for allowing Idle Extension Notification are met by this DN.

- If an extension has Call Waiting configured, it is not possible to request Idle Extension Notification. Call Waiting has precedence over the Idle Extension Notification feature.
- When an extension is blocked for receiving calls due to the Idle Extension Notification feature, camp-on is not possible.
- It is not possible to request for Idle Extension Notification towards an extension that has the Do-Not-Disturb feature activated.

- It is not possible to request for Idle Extension Notification towards an extension that is Second Degree Busy. Idle Extension Notification is only possible on an extension that is First Degree Busy.
- It is not possible to set Idle Extension Notification towards a pilot DN.
- If the attendant dials a busy extension that has Hunting configured and where all the DNs in the hunt chain are busy, Idle Extension Notification may be requested towards the dialed extension.
- ISDN BRI extensions always have the Call Waiting feature equipped, therefore Idle Extension Notification is not possible.
- The Idle Extension Notification feature is available for ISDN Meridian Customer Defined Networking (MCDN) networks using BRI TIE trunks if Network Attendant Service is configured.
- It is not possible to request for Idle Extension Notification towards an extension that has the Make Set Busy feature activated.
- If Idle Extension Notification is requested for a Multiple Call Arrangement DN, the first extension with this DN that becomes idle will cause the recall. This extension will also be blocked from receiving calls.
- An Idle Extension Notification recall will always recall to the same attendant, regardless of the configuration of the Recall To Same Attendant (RTSA) feature.
- During the time that an extension is supervised or temporarily blocked from receiving calls due to the Idle Extension Notification feature, it is possible to activate Ring Again towards that extension. It is also possible to request for Idle Extension Notification on an extension that is supervised for Ring Again. When the extension becomes idle, the Idle Extension Notification will be served first.

Package Requirements

Feature	Package Number
ISDN	145
NAS	159

SACP	181
SUPP	131
BKI	127

In-Band ANI; (Automatic Number Identification)

In-Band ANI is a Northern Telecom Meridian 1 capability which allows an Inter-Exchange Carrier such as MCI or Sprint to send the Meridian 1 the calling party's 10 digit phone number through standard digital trunks (T1s). The Meridian 1 can then terminate the number to the following:

- The digit display of an auto terminating ACD set
- A Meridian Link connection
- A CDR record

Note: In-Band ANI is only supported via MCI using the DMS-250 Inter-exchange switch.

A three or four digit Dialed Number Identification Service (DNIS) can be delivered instead of the ANI digits if required.

Package Requirements

The In-Band ANI feature requires software options; 40, 98, 145, 146 and 149.

Incoming Trunk Programmable Calling Line Identification

The Incoming Trunk Programmable Calling Line Identification feature allows a billing number to be assigned to incoming trunk routes. The billing number length can be from one to 16 digits, and is only used when the incoming trunk terminates to a PRI trunk connected to a Public Exchange/Central Office. The billing number is inserted into the Calling Line Identification (CLID) field of the outgoing PRI trunk route.

An option is also provided that allows the billing number to have the "Presentation Allowed" field in the outgoing route CLID to be allowed or denied. This will allow or deny the display of the billing number when the call terminates on a set off the Central Office.

In addition, incoming routes that support CLID can have the Billing Number replace the CLID for tandeming only.

Operating parameters

This feature is not supported on SL-1 interfaces.

M911 trunks do not support the billing number.

If the route defined is both incoming and outgoing, the billing number will only be used for incoming calls to support outgoing Integrated Services Digital Network (ISDN) routes.

The billing number is not unique; the same number can be programmed for multiple routes.

The billing number is only inserted on tandem calls for supporting trunks to the Central Office. Therefore, the display of billing number on sets is not provided, and the CDR output will not show the billing number.

There is no control over how the Central Office uses the billing number. The presentation indicator is configurable to either allow or deny the displaying of the billing number. This is only used for the outgoing call to the Central Office which means when the call terminates on a set off the Central Office the billing number will be displayed at that set if the option is set (BDSP = YES).

Call redirection is not supported (e.g., if the incoming call terminates on the Meridian 1 and is transferred, or call forwarded to the Central Office, the billing number is not passed on to the Central Office).

Feature interactions

Not applicable.

Feature packaging

The Incoming Trunk Programmable Calling Line Identification feature is part of basic X11 system software. The following software option package is required to activate this feature:

- Integrated Services Digital Network (ISDN) package 145.

For ISDN and networking, some or all of the following packages may be required:

- Basic Alternate Route Selection (BARS) package 57
- Network Alternate Route Selection (NARS) package 58
- Coordinated Dialing Plan (CDP) package 59

- Basic Routing (BRTE) package 14, and
- Network Class of Service (NCOS) package 32.

Feature implementation

LD 16 – Configure the incoming route.

Prompt	Response	Description
REQ	NEW, or CHG	New, or Change.
TYPE	RDB	Route data block.
...		
BILN	(NO), YES	Billing number (is not) is required.
BLN	1-(10)-16	Billing number length. The default is 10 digits.
BNUM	x...x	Billing number (1 to 16 digits).
BDSP	(NO), YES	(Do not) display Billing Number.

LD 16 – Configure the outgoing route.

Prompt	Response	Description
REQ	CHG	Change.
TYPE	RDB	Route data block.
...		
ISDN	(NO), YES	ISDN route must be YES.
...		
IFC	xxxx	Select the appropriate interface type for route (cannot be SL1 or IDA).
SBN	(NO), YES	(Do not) send billing number. Must be set to YES.

Feature operation

No specific operating instructions are required to use this feature.

ISDN Calling Line Identification enhancements

The capabilities introduced by the ISDN Calling Line Identification (CLID) Enhancements greatly increases the functionality of CLID within any ISDN network.

These enhancements replace the previous method of constructing CLID, and allow much more flexibility when programming CLID for any telephone set on a Meridian 1. Prior to Release 22, a CLID was defined as either a Listed Directory Number (LDN) or Primary Directory Number (PDN). The contents of these data fields were used to generate the CLID for a call. The CLID could only be built from key 0 of a set. This meant that regardless of what key was used to make a call, it was the CLID for key 0 that was sent. Also, only one office code and one location code could have been assigned in the CLID for a customer.

CLID is now table-driven (when LD 15 is loaded, a customer can configure a CLID table), and virtually any of the information contained in the fields of the CLID table can now be programmed against any DN or DN key, on a per set basis. This means that the CLID that is sent from a set is now predicated on what is in the CLID table, rather than the LDN or PDN. That is, a CLID for any key is now built by taking the information contained in a particular field in the CLID table and adding that information to the key's DN. A multi-line set can now have DN keys that each has its own CLID. Or, as explained in "How CLID entries are assigned to a set" on page 173, the CLID of any one key could, on a set, be programmed to use the CLID of any other key on the set.

Also, the Meridian 1 can now support multiple office codes, location codes and steering codes in CLID (this is more fully explained in the section "How a CLID table is built", which follows.) This means that any telephone set on one Meridian 1 can send a CLID that will have calls returned to another Meridian 1. This type of configuration would typically be used in cases where a customer would want calls to be returned to only one central location.

Note: Since the system does not perform verification of CLID entries that are defined in a CLID table, it is the responsibility of the system administrator to ensure that DN keys are programmed correctly.

How a CLID table is built

New prompts have been added to LD 15 that create a CLID table for a customer. This table contains CLID 'entries' (up to 4,000.) Each entry contains unique information pertaining to CLID, as explained in the following sections.

North American Numbering Plan

For users of a North American Numbering Plan, the Meridian 1 can now support multiple Home Central Office Codes (HNXXs), Home Numbering Plan Area (HNPA) codes, Home Location Codes (HLOCs) and Local Steering Codes (LSCs), on a DN or DN key basis.

For a North American Numbering Plan, each CLID entry can contain the following:

- a one-six digit national code for a home national number (HNTN);
- a one-12 digit local code for a home local number (HLCL), or a one-12 digit Listed Directory Number for a switchboard;
- a one-seven digit Home Location Code (HLOC); and
- a one-seven digit Local Steering Code (LSC).

International Numbering Plan

For users of an International Numbering Plan, the Meridian 1 can now support multiple Prefix 1 (PFX1) and Prefix 2 (PFX2) contents, and multiple Home Location Codes (HLOCs) and Local Steering Codes (LSCs), on a DN or DN key basis.

For an International Numbering Plan, each CLID entry can now contain the following:

- a one-six digit national code for a home national number (HNTN), which is the equivalent of PFX1;

- a one-12 digit local code for a home local number (HLCL), which is the equivalent of PFX2, or a one-12 digit Listed Directory Number for a switchboard;
- a one-seven digit Home Location Code (HLOC);
- a one-seven digit Local Steering Code (LSC).

Another new capability, which applies to both the North American Numbering Plan and the International Numbering Plan, pertains to how the HLCL is constructed. A new prompt, DIDN (which signifies “use DN as a DID number”) in LD 15, allows the HLCL to be built either using the digits in the HLCL plus the digits of the active key (if DIDN is set to “YES” - the DN is considered to be a DID number and is included in the CLID), or only the digits in the HLCL (if DIDN is set to “NO” - the DN is not included in the CLID since it is not a DID number), or based on a search on the DN keys, beginning from key 0, to find the CLID to be used (DIDN is set to “SRCH”). Please refer to Examples one to six in the “Examples of CLID generation” section starting on page 174.

How CLID entries are assigned to a set

Once the CLID table has been built for a customer, any CLID entry can be assigned to any set, on a per DN or DN key basis (any DN or DN key can be programmed against the information defined for any CLID entry in the CLID table.) This means that for a multi-line set, DN key 0 may send one CLID (the information contained in one CLID entry), DN key 1 may send a different CLID (the information contained in another CLID entry), and DN key 2 may send yet another CLID (the information contained in a third CLID entry). Therefore, a customer may now send different CLIDs from the same set.

Another enhancement pertains to Meridian 1 proprietary sets. When configuring the CLID for a DN key in LD 11, the value entered against the KEY prompt may be a CLID table entry number (0-3999), which corresponds to a CLID entry in the CLID table or 'D'. If 'D' is entered, the Meridian 1 initiates a search on the set for a DN key, starting from key 0. The first found CLID is then sent as the CLID of the active DN key. This means that a call can be made on one key, and the CLID of another key is sent. This configuration is typically used in an ACD or Hotline DN key application, where, for example, the CLID for a particular key is not desired to be sent. Please refer to Examples seven, eight and nine in the "Examples of CLID generation" on page 174.

Prior to the CLID enhancement, for feature keys, such as the Call Transfer key (TRN), the Conference key (AO3 and AO6) and the No-hold Conference key (NHC), the DN of key 0 was used as the CLID DN when a call transfer or conference occurred over ISDN trunks. With the CLID enhancement, the CLID DN is now associated with the active DN key, rather than key 0.

Examples of CLID generation

The examples that follow show CLID generation using different combinations of CLID entries for DN keys, for Private ESN UDP/CDP calls and for Public Local and Public National calls.

Most of the examples use a North American Numbering Plan, since the construction of CLID entries in a CLID is the same for both a North American Numbering Plan and an International Numbering Plan. In some cases, however, examples are provided that pertain to calls using an International Numbering Plan.

Therefore, unless otherwise stated in the headings, the examples provided in the following sections pertain to calls made using a North American Numbering Plan.

The CLID construction for a CLID call type is as follows:

- Private ESN UDP Number - HLOC + DN
- Private ESN CDP Number - LSC + DN

- Public Local Number - HLCL + DN
- Public National Number - HNTN + HLCL + DN

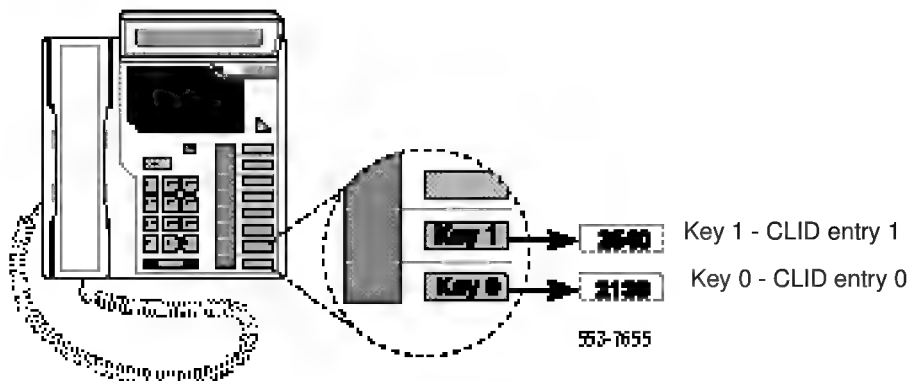
Please note that for calls made using the International Numbering Plan, the CLID for a Public Number is a National Number. For the examples of using the International Numbering Plan, the construction of a Public Local Number is for reference purposes only.

Example 1 - Set has DID number on DN key 0

In this example, the calls are made on DN key 0, which has a DID number. Key 0 is configured against CLID table entry 0, and key 1 is configured against CLID table entry 1.

Table 8
Set has DID number on DN key 0

CLID entry	HNTN (code for the home national number)	HLCL (code for the home local number), or LDN	DIDN (use the DN as the DID?)	HLOC (home location code)	LSC (local steering code)
Entry 0	415	940	YES	646	5
Entry 1	415	9699170	NO	646	5
Entry 2			SRCH	646	5



- 1** For a private ESN UDP call made from Key 0 (DN 2130) on the set, the CLID would be built as follows:
 - HLOC from CLID entry 0 (646) plus the DN of the active key (2130).
 - That is, the CLID that is sent would be 646 2130.
- 2** For a private ESN CDP call made from Key 0 (DN 2130) on the set, the CLID would be built as follows:
 - LSC from CLID entry 0 (5) plus the DN of the active key (2130).
 - That is, the CLID that is sent would be 5 2130.
- 3** For a public local call made from Key 0 (DN 2130) on the set, the CLID would be built as follows:
 - HLCL from CLID entry 0 (940) plus the DN of the active key (2130).
 - That is, the CLID that is sent would be 940 2130.
- 4** For a public national call made from Key 0 (DN 2130) on the set, the CLID would be built as follows:
 - HNTN from CLID entry 0 (415) plus the HLCL from CLID entry 0 (940) plus the DN of the active key (2130).
 - That is, the CLID that is sent would be 415 940 2130.

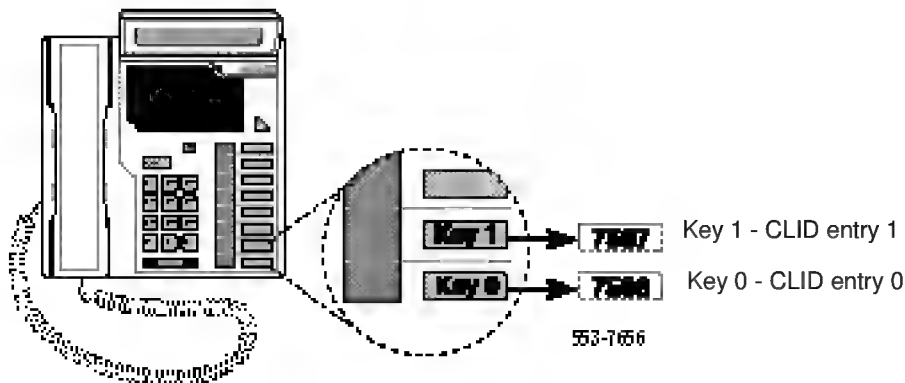
Example 2 - Set has DID number on DN key 0, International Numbering Plan.

In this example, the calls are made on DN key 0, which has a DID number. Key 0 is configured against CLID table entry 0, and key 1 is configured against CLID table entry 1.

Table 9

Set has DID number on DN key 0, for an International Numbering Plan.

CLID entry	HNTN (code for the home national number, equivalent to PFX1)	HLCL (code for the home local number, equivalent to PFX2), or LDN	DIDN (use the DN as the DID?)	HLOC (home location code)	LSC (local steering code)
Entry 0	2	6476	YES	578	6
Entry 1	2	64767676	NO	578	6
Entry 2			SRCH	578	6



- 1** For a private ESN UDP call made from Key 0 (DN 7566) on the set, the CLID would be built as follows:
 - HLOC from CLID entry 0 (578) plus the DN of the active key (7566).
 - That is, the CLID that is sent would be 578 7566.
- 2** For a private ESN CDP call made from Key 0 (DN 7566) on the set, the CLID would be built as follows:
 - LSC from CLID entry 0 (6) plus the DN of the active key (7566).
 - That is, the CLID that is sent would be 6 7566.
- 3** For a public local call made from Key 0 (DN 7566) on the set, the CLID would be built as follows:
 - HLCL from CLID entry 0 (6476) plus the DN of the active key (7566).
 - That is, the CLID that is sent would be 6476 7566.
- 4** For a public national call made from Key 0 (DN 7566) on the set, the CLID would be built as follows:
 - HNTN from CLID entry 0 (2) plus the HLCL from CLID entry 0 (6476) plus the DN of the active key (7566).
 - That is, the CLID that is sent would be 2 6476 7566.

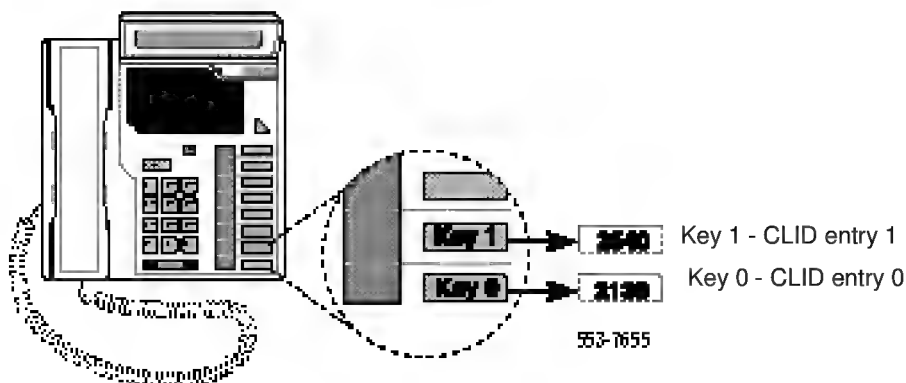
Example 3 - Set does not have a DID number on DN key 1 (DIDN set to NO)

In this example, the calls are made on DN key 1, which does not have a DID number. Key 0 is configured against CLID table entry 0, and key 1 is configured against CLID table entry 1, which has the DIDN option set to NO. This means that the CLID is built using only the digits defined in the HLCL field of table entry 1 (the DN of key 1 would not be sent in the CLID after the HLCL digits.)

Table 10

Set does not have a DID number on DN key 1 (DIDN set to NO).

CLID entry	HNTN (code for the home national number)	HLCL (code for the home local number), or LDN	DIDN (use the DN as the DID?)	HLOC (home location code)	LSC (local steering code)
Entry 0	415	940	YES	646	5
Entry 1	415	9699170	NO	646	5
Entry 2			SRCH	646	5



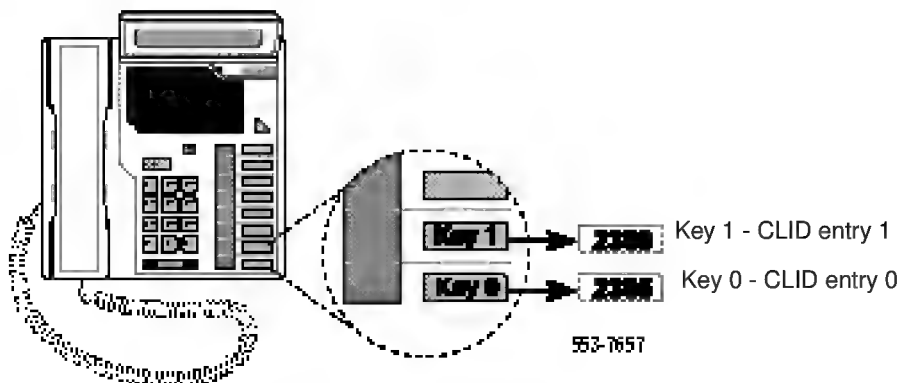
- 1** For a private ESN UDP call made from Key 1 (DN 2540) on the set, the CLID would be built as follows:
 - HLOC from CLID entry 1 (646) plus the DN of the active key (2540).
 - That is, the CLID that is sent would be 646 2540.
- 2** For a private ESN CDP call made from Key 1 (DN 2540) on the set, the CLID would be built as follows:
 - LSC from CLID entry 1 (5) plus the DN of the active key (2540).
 - That is, the CLID that is sent would be 5 2540.
- 3** For a public local call made from Key 1 (DN 2540) on the set, the CLID would be built as follows:
 - HLCL from CLID entry 1 (9699170) - the DN of key 1 is not sent.
 - That is, the CLID that is sent would be 9699170.
- 4** For a public national call made from Key 1 (DN 2540) on the set, the CLID would be built as follows:
 - HNTN from CLID entry 1 (415) plus the HLCL from CLID entry 1 (9699170).
 - That is, the CLID that is sent would be 415 9699170.

Example 4 - Set does not have a DID number on DN key 1 (DIDN set to NO), International Numbering Plan.

In this example, the calls are made on DN key 1, which does not have a DID number. Key 0 is configured against CLID table entry 0, and key 1 is configured against CLID table entry 1, which has the DIDN option set to NO. This means that the CLID is built using only the digits defined in the HLCL field of table entry 1 (the DN of key 1 would not be sent in the CLID after the HLCL digits.)

Table 11**Set does not have a DID number on DN key 1 (DIDN set to NO).**

CLID entry	HNTN (code for the home national number)	HLCL (code for the home local number), or LDN	DIDN (use the DN as the DID?)	HLOC (home location code)	LSC (local steering code)
Entry 0	89	3505	YES	581	6
Entry 1	89	35052020	NO	581	6
Entry 2			SRCH	581	6



- 1** For a private ESN UDP call made from Key 1 (DN 2366) on the set, the CLID would be built as follows:
 - HLOC from CLID entry 1 (581) plus the DN of the active key (2366).
 - That is, the CLID that is sent would be 581 2366.
- 2** For a private ESN CDP call made from Key 1 (DN 2366) on the set, the CLID would be built as follows:
 - LSC from CLID entry 1 (6) plus the DN of the active key (2366).
 - That is, the CLID that is sent would be 6 2366.
- 3** For a public local call made from Key 1 (DN 2366) on the set, the CLID would be built as follows:
 - HLCL from CLID entry 1 (35052020) - the DN of key 1 is not sent.
 - That is, the CLID that is sent would be 35052020.
- 4** For a public national call made from Key 1 (DN 2366) on the set, the CLID would be built as follows:
 - HNTN from CLID entry 1 (89) plus the HLCL from CLID entry 1 (35052020).
 - That is, the CLID that is sent would be 89 35052020.

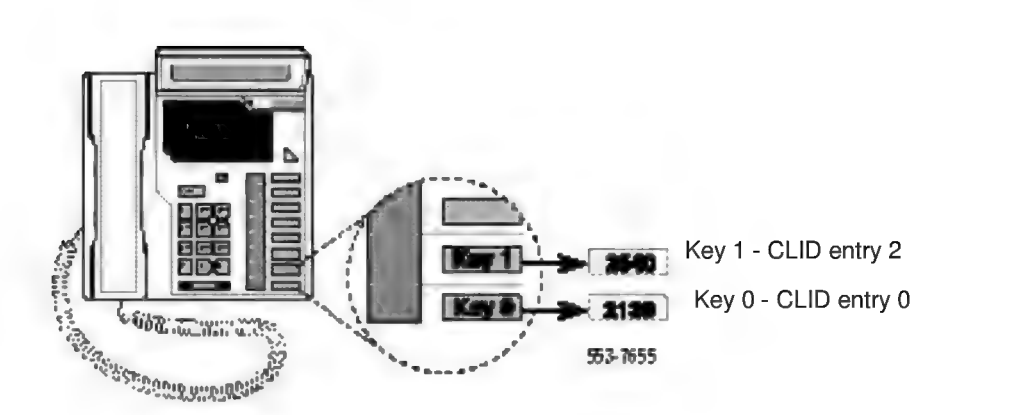
Example 5 - Set does not have DID number on DN key 1, SRCH option is used (DIDN is set to SRCH)

In this example, the calls are made on DN key 1, which does not have a DID number. Key 0 is configured against CLID table entry 0, and key 1 is configured against CLID table entry 2, which has the DIDN option set to SRCH.

This means that the CLID assigned for key 1 is constructed based on a search starting from key 0. When a CLID entry is found, which has DIDN set to YES (that would be key 0), the HLCL for that key is used in the CLID for key 1. Therefore, the CLID that is sent for key 1 would contain the HLCL of key 0 plus the DN of key 0.

Table 12
Set does not have a DID number on DN key 1, SRCH is used (DIDN is set to SRCH).

CLID entry	HNTN (code for the home national number)	HLCL (code for the home local number), or LDN	DIDN (use the DN as the DID?)	HLOC (home location code)	LSC (local steering code)
Entry 0	415	940	YES	655	6
Entry 1	415	9699170	NO	655	6
Entry 2			SRCH	655	6



- 1** For a private ESN UDP call made from Key 1 (DN 2540) on the set, the CLID would be built as follows:
 - HLOC from CLID entry 2 (655) plus the DN of the active key (2540).
 - That is, the CLID that is sent would be 655 2540.
- 2** For a private ESN CDP call made from Key 1 (DN 2540) on the set, the CLID would be built as follows:
 - LSC from CLID entry 2 (6) plus the DN of the active key (2540).
 - That is, the CLID that is sent would be 6 2540.
- 3** For a public local call made from Key 1 (DN 2540) on the set, the CLID would be built as follows:
 - HLCL of CLID entry with DIDN set to YES (the HLCL of key 0, which is 940) plus the DN key 0 (2130.)
 - That is, the CLID that is sent would be 940 2130.
- 4** For a public national call made from Key 1 (DN 2540) on the set, the CLID would be built as follows:
 - HNTN from CLID entry 0 (415) plus the HLCL from CLID entry 0 (940) plus the DN of key 0.
 - That is, the CLID that is sent would be 415 940 2130.

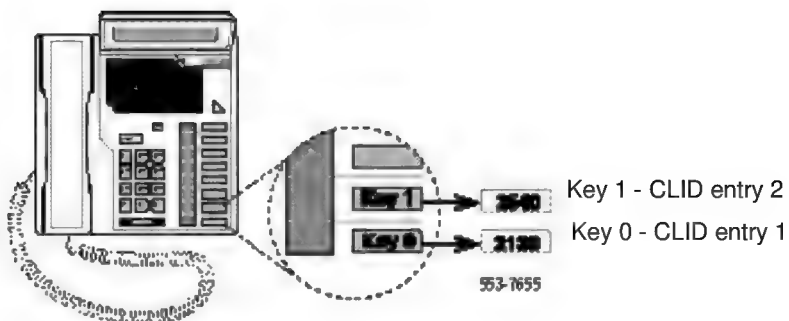
Example 6 -Set does not have DID number on DN key 1, SRCH option is used but does not find a DID

In this example, the calls are made on DN key 1, which does not have a DID number. Key 0 is configured against CLID table entry 1, and key 1 is configured against CLID table entry 2, which has the DIDN option set to SRCH. This means that the CLID assigned for key 1 is constructed based on a search starting from key 0.

Key 0 is configured against table entry 1. Since table entry 1 has DIDN set to NO, the search next takes place on key 1, which is configured against table entry 2. Since table entry 2 does not have DIDN set to YES either, the search fails to find a CLID entry which has DIDN set to YES. This means that the CLID for key 1 is constructed using only the HLCL of the active DN (that is, the HLCL for key 1, which is the HLCL defined in table entry 2.)

Table 13**Set does not have a DID number on DN key 1, SRCH option fails to find a DID.**

CLID entry	HNTN (code for the home national number)	HLCL (code for the home local number), or LDN	DIDN (use the DN as the DID?)	HLOC (home location code)	LSC (local steering code)
Entry 0	415	940	YES	646	5
Entry 1	415	9699170	NO	646	5
Entry 2	408	9885560	SRCH	655	6



- 1 For a private ESN UDP call made from Key 1 (DN 2540) on the set, the CLID would be built as follows:
 - HLOC from CLID entry 2 (655) plus the DN of the active key (key 1, 2540).
 - That is, the CLID that is sent would be 655 2540.
- 2 For a private ESN CDP call made from Key 1 (DN 2540) on the set, the CLID would be built as follows:
 - LSC from CLID entry 2 (6) plus the DN of the active key (2540).
 - That is, the CLID that is sent would be 6 2540.
- 3 For a public local call made from Key 1 (DN 2540) on the set, the CLID would be built as follows:
 - HLCL of CLID entry 2 (9885560) - since the search failed to find a DID number, only the HLCL of the active key (key 1, which is configured against table entry 2) is sent in the CLID. Since the DN of Key 1 (2540) is not a DID number, it is not sent in the CLID.
 - That is, the CLID that is sent would be 9885560.
- 4 For a public national call made from Key 1 (DN 2540) on the set, the CLID would be built as follows:
 - HNTN from CLID entry 2 (408) plus the HLCL from CLID entry 2 (9885560) - since the DN of Key 1 is not a DID number, the DN (2540) is not sent..
 - That is, the CLID that is sent would be 408 9885560.

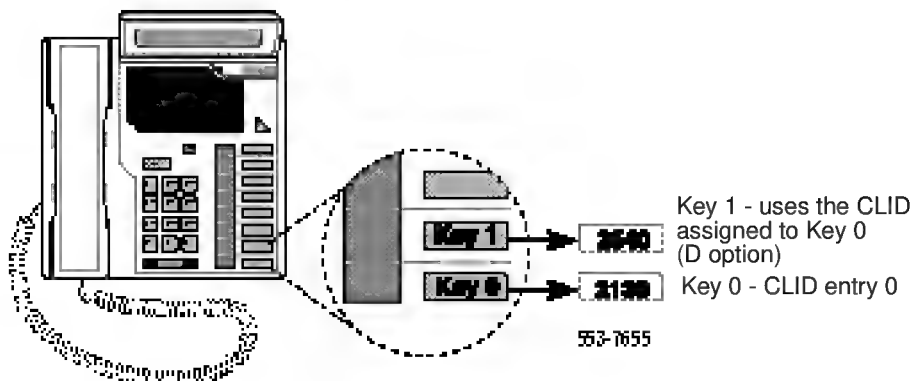
Example 7 - Set with DN KEY prompt of “D” on key 1

In this example, the calls are made on DN key 1, which has the KEY prompt set to “D” in LD 11. This means that a search is done on the set for a DN key, starting from key 0. The CLID of the found DN (key 0 in this case) key is used as the CLID of the active DN key; that is, the CLID for key 0 is used as the CLID for key 1.

Key 0 is configured against CLID table entry 0, and key 1 uses the CLID assigned to key 0.

Table 14**Set with DN KEY prompt of “D” on key 1.**

CLID entry	HNTN (code for the home national number)	HLCL (code for the home local number), or LDN	DIDN (use the DN as the DID?)	HLOC (home location code)	LSC (local steering code)
Entry 0	415	940	YES	646	5
Entry 1	415	9699170	NO	646	5
Entry 2			SRCH	646	6



- 1 For a private ESN UDP call made from Key 1 (DN 2540) on the set, the CLID would be built as follows:
 - HLOC from CLID entry 0 (646) plus the DN for key 0 (2130) - since the Key option has been set to 'D', a search is done from key 0 to find a DN key. The CLID for the found DN key is used as the CLID of active DN key - therefore, CLID for key 0 (the found DN) is used in the CLID for key 1. This also applies to cases 2, 3 and 4 which follow.
 - Therefore, the CLID that is sent would be 646 2130.
- 2 For a private ESN CDP call made from Key 1 (DN 2540) on the set, the CLID would be built as follows:
 - LSC from CLID entry 0 (5) plus the DN of key 0 (2130).
 - That is, the CLID that is sent would be 5 2130.
- 3 For a public local call made from Key 1 (DN 2540) on the set, the CLID would be built as follows:
 - HLCL of CLID entry 0 (940) plus the DN of key 0 (2130).
 - That is, the CLID that is sent would be 940 2130.
- 4 For a public national call made from Key 1 (DN 2540) on the set, the CLID would be built as follows:
 - HNTN from CLID entry 0 (415) plus the HLCL from CLID entry 0 (940) plus the DN of key 0 (2130).
 - That is, the CLID that is sent would be 415 940 2130.

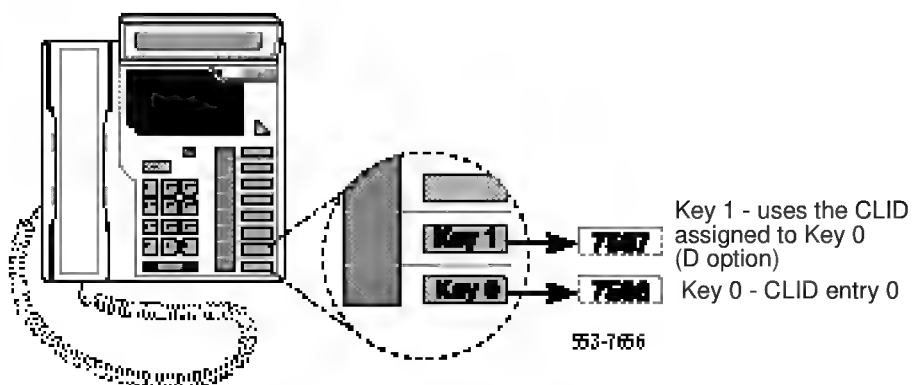
Example 8 - Set with DN KEY prompt of “D” on key 1, International Numbering Plan

In this example, the calls are made on DN key 1, which has the KEY prompt set to “D” in LD 11. This means that a search is done on the set for a DN key, starting from key 0. The CLID of the found DN (key 0 in this case) key is used as the CLID of the active DN key, that is, the CLID for key 0 is used as the CLID for key 1.

Key 0 is configured against CLID table entry 0, and key 1 uses the CLID assigned to key 0.

Table 15
Set with DN KEY prompt of “D” on key 1.

CLID entry	HNTN (code for the home national number)	HLCL (code for the home local number), or LDN	DIDN (use the DN as the DID?)	HLOC (home location code)	LSC (local steering code)
Entry 0	2	6476	YES	578	6
Entry 1	2	64767676	NO	578	6
Entry 2			SRCH	578	6



- 1 For a private ESN UDP call made from Key 1 (DN 7567) on the set, the CLID would be built as follows:
 - HLOC from CLID entry 0 (578) plus the DN for key 0 (7566) - since the Key option has been set to 'D', a search is done from key 0 to find a DN key. The CLID for the found DN key is used as the CLID of active DN key - therefore, CLID for key 0 (the found DN) is used in the CLID for key 1. This also applies to cases 2, 3, and 4 which follow.
 - Therefore, the CLID that is sent would be 578 7566.
- 2 For a private ESN CDP call made from Key 1 (DN 7567) on the set, the CLID would be built as follows:
 - LSC from CLID entry 0 (6) plus the DN of key 0 (7566).
 - That is, the CLID that is sent would be 5 2130.
- 3 For a public local call made from Key 1 (DN 7567) on the set, the CLID would be built as follows:
 - HLCL of CLID entry 0 (6476) plus the DN of key 0 (7566).
 - That is, the CLID that is sent would be 6476 7566.
- 4 For a public national call made from Key 1 (DN 7567) on the set, the CLID would be built as follows:
 - HNTN from CLID entry 0 (2) plus the HLCL from CLID entry 0 (6476) plus the DN of key 0 (7566).
 - That is, the CLID that is sent would be 2 6476 7566.

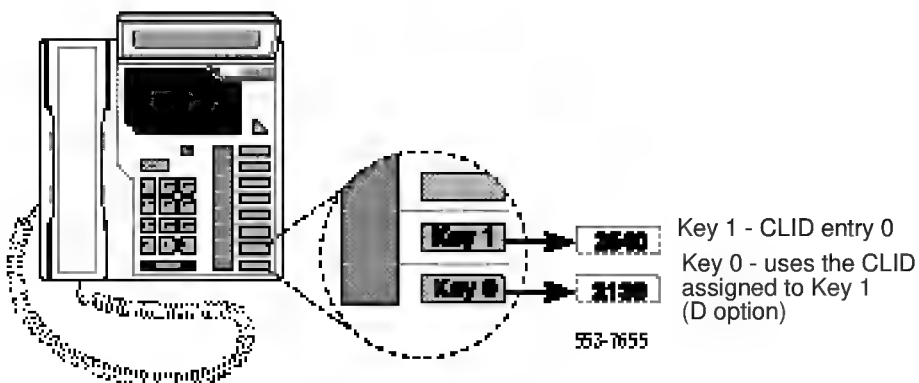
Example 9 - Set with DN KEY prompt of “D” on key 0

In this example, the calls are made on DN key 0, which has the KEY prompt set to “D” in LD 11. This means that a search is done on the set for a DN key, starting from key 0. The CLID of the found DN key (key 1 in this case) is then used as the CLID of the active DN key, that is, the CLID assigned to key 1 is used as the CLID for key 0.

Key 1 is configured against CLID table entry 0, and key 0 uses the CLID assigned to key 1.

Table 16
Set with DN KEY prompt of “D” on key 0.

CLID entry	HNTN (code for the home national number)	HLCL (code for the home local number), or LDN	DIDN (use the DN as the DID?)	HLOC (home location code)	LSC (local steering code)
Entry 0	415	940	YES	646	5
Entry 1	415	9699170	NO	646	5
Entry 2			SRCH	655	6



- 1 For a private ESN UDP call made from Key 0 (DN 2130) on the set, the CLID would be built as follows:
 - HLOC from CLID entry 0 (646) plus the DN for key 1 (2540) - since the Key option has been set to 'D', a search is done from key 0 to find a DN key. The CLID for the found DN key is used as the CLID of active DN key - therefore, CLID for key 1 (the found DN) is used in the CLID for key 0. This also applies to cases 2, 3, and 4 which follow.
 - Therefore, the CLID that is sent would be 646 2540.
- 2 For a private ESN CDP call made from Key 0 (DN 2130) on the set, the CLID would be built as follows:
 - LSC from CLID entry 0 (5) plus the DN of key 1 (2540).
 - That is, the CLID that is sent would be 5 2540.
- 3 For a public local call made from Key 0 (DN 2130) on the set, the CLID would be built as follows:
 - HLCL of CLID entry 0 (940) plus the DN of key 1 (2540).
 - That is, the CLID that is sent would be 940 2540.
- 4 For a public national call made from Key 0 (DN 2130) on the set, the CLID would be built as follows:
 - HNTN from CLID entry 0 (415) plus the HLCL from CLID entry 0 (940) plus the DN of key 1 (2540).
 - That is, the CLID that is sent would be 415 940 2540.

Operating parameters

In order for CLID to be properly delivered, a CLID entry must be defined in the CLID table for a customer. If a CLID entry or table is not defined, the active DN is sent as CLID.

The ISDN Calling Line Identification (CLID) Enhancements feature only pertains to calls that are made over ISDN routes.

The CLID that is sent from the Meridian 1 may be subject to any restrictions which may be imposed by the serving Telco.

This feature does not change the operation of CLID for attendant consoles. The codes for different call types are extracted from CLID entry 0 in LD 15, the customer data block. If the call type is private, the attendant DN is used. If the call type is public, LDN0 is used.

There is no system validation of digits entered in the CLID entry via a service change. Therefore, caution must be taken that any digits that are entered are valid and correct.

There is no cross-validation of the CLID entry associated with a set against the CLID entry entered in LD 15. If a CLID entry is deleted from the CLID table and the CLID entry remains assigned to a DN key, the active DN is sent as CLID.

The maximum number of digits for a CLID in an ISDN message is 16.

The restriction remains of constructing a seven-digit local number or a 10-digit national number, for the North American Numbering Plan. Also, a seven-digit maximum is maintained for an ESN Uniform Dialing Plan number, if the Flexible Numbering Plan package is not equipped. The seven and 10 digit restriction for a public number does not apply to International ISDN interfaces.

The CLID is constructed using the information in the CLID table associated with the active DN key for the calling party in the Setup message and the connected party in the Connected and Notify messages. This feature does not change the Information Elements pertaining to any other ISDN network DNs, such as for Redirecting and Original Called Number.

For ISDN supplementary services, the ISDN CLID enhancements do not change how a Network DN is constructed. For a Local Number, the Network DN is formed using the Home Central Office Code (HNXX)/Prefix 2 (PFX2). For ESN Numbers, the Network DN is formed using the Home Location Code (HLOC) for a Uniform Dialing Plan number or the Local Steering Code (LSC) for a Coordinated Dialing Plan number.

Feature interactions

Attendant Administration

Administration of a CLID entry, for a set from an attendant console, is not supported.

Automatic Call Distribution

The ACD DN is sent as the CLID for a call made by an ACD agent using a DN key on a key other than Key 0. With the feature enhancement, the CLID is constructed using the CLID entry associated with the active DN key. The ACD agent ID is not designed to be sent as the CLID.

If an ACD agent has an active call on Key 0 and if a call transfer or conference is initiated by the ACD agent, the CLID entry associated with the ACD DN Key 0 is used as the CLID (for remote calls only.)

There is no CLID entry for an analog (500/2500 type) ACD DN. The CLID associated with the analog (500/2500 type) DN is used when a call transfer or conference is initiated by an ACD agent on an analog (500/2500 type) set.

Call Detail Recording

The CLID in the CDR records, including the X records, contains the DN of the key from which the call is made, not the DN of Key 0.

Call Pickup Network Wide

The Private Integrated Services Network Exchange (PINX) DN in the customer data block is used for Call Pickup Network Wide. The network DN for the PINX DN is constructed using the existing Home Location Code (HLOC) or Local Steering Code (LSC) in LD 15. The DN of the originating party is constructed using the CLID associated with the active DN key. The DN of the originally called (ringing) party is constructed using the existing HLOC or LSC in LD 15.

For calls picked up from a secondary DN, the redirection DN in the Notify message is formatted with the CLID entry 0 of LD 15.

Calling Party Name Display

If a call transfer or conference is initiated on a multiple appearance DN programmed on a key other than Key 0, the Call Party Name Display associated with the DN of the active key is used, rather than the Call Party Name Display for Key 0.

CLID for an ISDN BRI set

For an internal call terminating on an ISDN BRI set, the calling set's Dialed Digits Denied (DDGD)/Dialed Digits Allowed (DDGA) Class of Service is used to determine whether to send Calling Party Number to the terminating ISDN BRI set for display purposes.

Connected Number

When a call is modified, such as by a call transfer, this feature enhancement will try to use the CLID entry associated with the active DN key if available, otherwise the connected number will be constructed using CLID entry 0.

Network Attendant Service

If Network Attendant Service is equipped, CLID entry 0 is used for incoming trunks.

Network Call Redirection

Network Call Redirection constructs Redirecting Number and Redirection Number. The feature enhancement does not change the construction of the Redirecting Number. However, the Redirection Number of the Notify message is constructed using the CLID entry 0 of LD 15.

Network Message Services**Message Waiting Indication with DMS**

When a user leaves a voice message, from a multiple appearance DN, on a key other than Key 0 (such as Key 1), the caller's recorded number will be the multiple appearance DN on Key 1, rather than the primary DN of Key 0. This means that when the user returns the call, he/she will ring the DN of Key 1 on all the sets that have the appearance of the DN.

When a user retrieves messages using a multiple appearance DN key other than Key 0, the user now retrieves the messages on the other DN key.

The mail box number for a Network Message Service user is based on the original called number, in the form of a Coordinated Dialing Plan (CDP) or Uniform Dialing Plan (UDP) number. The construction of the original called number is not changed. If a user's DN is using a different Home Location Code or Local Steering Code for CLID, the Meridian Mail database adds the user's CLID as the mail box number. For example, if the first called number for a user is 6462300, a UDP number, and the user's CLID is 6472300, using CLID entry 'x', the user's mail box numbers are 6462300 and 6472300.

In general, with the enhancement of sending the DN associated with an active key to make a call to Meridian Mail, the secondary key's DN is included in the Meridian Mail User's definition (for either a local or remote user.)

Network Ring Again

The Network Ring Again feature remains operational when a user uses a multiple appearance DN on a key other than Key 0 to activate Network Ring Again, since Network Ring Again saves the Terminal Number of the set that initiates Network Ring Again.

Remote Virtual Queuing

The Remote Virtual Queuing (RVQ) feature remains operational when a user uses a multiple appearance DN on a key other than Key 0 to activate RVQ.

Transaction Capabilities Application Part (TCAP)

The network DN for TCAP messages is constructed using the existing Home Location Code (HLOC), Local Steering Code (LSC) or Home Numbering Plan Area (HNPA)/Home Central Office Code (HNXX) prompts in LD 15. The feature enhancement does not change the construction of the TCAP messages.

Feature packaging

The ISDN Calling Line Identification (CLID) Enhancements feature does not introduce any new package. However, Integrated Services Digital Network (ISDN) package 145 is required as a dependency.

Feature implementation

The following steps are required to configure the ISDN CLID enhancements:

- In LD 15, construct the CLID table for a customer;
- In LD 21, print the CLID table (to verify CLID entries);
- In LD 10, define the CLID entry for analog (500/2500 type) sets;
- In LD 11, define the CLID entry for DN keys for Meridian 1 proprietary sets;
- In LD 27, define the CLID entry for ISDN BRI sets.

LD 15 — Construct the CLID entry for a customer.

Prompt	Response	Description
REQ:	NEW, CHG	Add new data, or change or delete existing data.
TYPE	NET	Networking data (if REQ = CHG only.)
CUST	0-31	Customer Number.
...		
ISDN	YES	Integrated Services Digital Network.
- PNI	1-327000	Private Network Identifier.
- CLID	YES (NO)	CLID option. YES = configure a CLID table for the customer. NO = (the default) do not configure a CLID table. In this case, the remaining prompts are not generated, and no CLID is sent for the customer.

- - SIZE	0-(256)-4000	The maximum number of CLID entries needed for a customer. If REQ = NEW, you may select the default value (256) by entering <CR> in response to this prompt. It is advised that you not define a size much larger than actually needed. This entry may be increased or decreased as required.
- - INTL	0-9999 X	Country code, for international number. Enter X to delete digits.
- - ENTRY	aaaa Xaaaa Xaaaa Xbbbb <CR>	aaaa = CLID entry to be configured. Xaaaa = CLID entry to be deleted. Xaaaa Xbbbb = CLID entries to be deleted. aaaa and bbbb must be a value between 0 and (SIZE-1). The ENTRY prompt is repeated until <CR> is entered as a response. If REQ = NEW, only one new entry may be created. The entry will be saved to system memory when the configuration for the entire overlay is completed. If REQ = CHG, as many entries as needed may be created, changed or deleted. The action for the entry will be saved to system memory after the CLID entry has been completely configured, that is, after the LSC prompt has been answered. If a new CLID entry is created, or an existing CLID entry is changed, the message "ENTRY aaaa SAVED" is displayed after the LSC prompt. If a CLID entry or CLID entries is/are deleted, the message "ENTRY aaaa DELETED" or "ENTRIES aaaa-bbbb DELETED" is displayed after the LSC prompt.
- - - HNTN	0-999999 X	National code for home national number (1-6 digits). X = delete digits.
- - - HLCL	0-999.9 X	Local code for home local number or Listed Directory Number (1-12 digits). X = delete digits.

--- DIDN (YES) NO SRCH	0-9999999 X	How to use the DN as a DID when constructing a CLID national or local number. YES = The default. The CLID is constructed using the digits defined in HLCL followed by the DN of the active key. NO = Construct the CLID using the digits defined in HLCL. SRCH = Search on the set, from key 0 - upwards, to find a CLID entry which has the DIDN set to YES. Use the found CLID to construct the local number.
--- HLOC	0-9999999 X	Home location code (ESN), 1-7 digits. X = delete digits.
--- LSC	0-9999999 X	Local steering code, 1-7 digits. X = delete digits.
ENTRY aaaa SAVED ENTRY aaaa DELETED ENTRIES aaaa-bbbb DELETED		Displayed message. Refer to Note 3 for the ENTRY prompt.

It is advised that after the CLID table has been built in LD 15, a printout be generated, using LD 21, to verify the table entries defined in LD 15.

LD 21 — Print the CLID table for a customer.

Prompt	Response	Description
REQ	PRT	Print the customer data block.
TYPE	CLID	CLID entry data.
CUST	0-31	Customer Number.
SIZE	0-4000	The value that was defined for SIZE in LD 15 is printed automatically after the customer number has been entered.
RNGE	aaaa aaaa bbbb <CR>	CLID entry to be printed. Range of CLID entries to be printed (from aaaaa to bbbbb), aaaa and bbbb must be between 0 and the value defined for SIZE-1 in LD 15. Printing begins when <CR> is entered.
INTL	0-9999	Country code, for international number, is printed.
ENTRY	aaaa	CLID entry number in CLID table is printed. If a range of entries is entered in the RNGE prompt, all of the entries in the specified range are printed in sequence.

- HNTN	0-999999	National code for home national number, 1-6 digits, is printed.
- HLCL	0-999..9	Local code for home local number or Listed Directory Number, 1-12 digits, is printed.
- DIDN	YES NO SRCH	The desired choice of how to use the DN as a DID, when constructing a CLID national or local number, will be printed.
- HLOC	0-9999999	Home location code (ESN), 1-7 digits, is printed
- LSC	0-9999999	Local steering code, 1-7 digits, is printed.
...		

LD 10 — Define the CLID entry for analog (500/2500 type) sets.

Prompt	Response	Description
REQ	NEW, CHG	Add new data, or change existing data.
TYPE	500	500 set.
TN	c u	Terminal Number address card and unit.
...		
DIG	xx yy	Dial Intercom group number and member number.
DN	xxxx (0)-N	DN and CLID entry. N = CLID SIZE-1 (SIZE defined in LD 15).
...		

LD 11 — Define the CLID entry for DN keys for Meridian 1 proprietary sets.

Note: When assigning a CLID entry to an ACD set, you cannot use the same position ID already on the set. The set must be first outted, or the ACD key must be nulled and then rebuilt with the table entry number.

Prompt	Response	Description
REQ	NEW, CHG	Add new data, or change existing data.
TYPE	xxxx	Type of telephone set.
TN	c u	Card and unit.
...		
KEY	xx MCN yyyy (0)-N/D xx MCR yyyy (0)-N/D xx PVN yyyy (0)-N/D xx PVR yyyy (0)-N/D xx SCN yyyy (0)-N/D xx SCR yyyy (0)-N/D	Telephone function key assignments. xx = key number. MCN = Multiple Call Non-ringing key. MCR = Multiple Call Ringing key. PVN = Private Line Non-Ringing key PVR = Private Line Ringing key SCN = Single Call Non-ringing key. SCR = Single Call Ringing key. yyyy = DN. (0)-N = CLID entry, with N = CLID SIZE-1 (SIZE defined in LD 15). D = CLID entry. Search for a CLID entry from key 0 upwards, to find a DN key. The found CLID is used as the CLID entry for the active DN key.

KEY	xx HOT D dd yyy...y zzzz m (0)-N/D	Two-way Hotline Direct key, where: xx = key number. dd = number of digits dialed. yyy...y = target number (terminating DN, maximum of 31 digits). zzzz = two-way hotline DN. m = one of the following Terminating Modes: H = Hotline (default) N = Non-ringing R = Ringing V = Voice (0)-N = CLID entry, with N = CLID SIZE-1 (SIZE defined in LD 15). D = CLID entry. Search for a CLID entry from key 0 upwards, to find a DN key. The found CLID is used as the CLID entry for the active DN key.
KEY	xx HOT L bbb zzzz (0)-N/D	Two-way Hotline List key, where: xx = key number. bbb = Hot Line List entry (0-999). zzzz = two-way hotline DN. (0)-N = CLID entry, with N = CLID SIZE-1 (SIZE defined in LD 15). D = CLID entry. Search for a CLID entry from key 0 upwards, to find a DN key. The found CLID is used as the CLID entry for the active DN key.

KEY	xx ACD aaaa 0-N/D bbbb	ACD key, where: xx = key number. aaaa = ACD DN or Message Center DN. 0-N = CLID entry, with N = CLID SIZE-1 (SIZE defined in LD 15). D = CLID entry. Search for a CLID entry from key 0 upwards, to find a DN key. The found CLID is used as the CLID entry for the active DN key. bbbb = ACD agent's position ID. Please refer to the note at the top of the overlay table, on page 203, that pertains to assigning a CLID entry to an ACD set.
-----	------------------------	--

LD 27 — Define the CLID entry for ISDN BRI sets.

Prompt	Response	Description
REQ:	NEW, CHG	Add new data, or change existing data.
TYPE	TSP	Administer the Terminal Service Profile on the Digital Subscriber Loop.
...		
- SPID	xxxxxxx	Service Profile Identifier.
DN	xxxx (0)-N	xxxx = DN to be associated with the TSP. (0)-N = CLID entry, with N = CLID SIZE-1 (SIZE defined in LD 15).
...		

Feature operation

No specific operating procedures are required to use this feature.

ISDN QSIG Basic Call

Integrated Services Digital Network (ISDN) Q Reference Signaling Point (QSIG) Basic complies with the ISDN protocol that specifies that Layer 3 signaling requirement for support of circuit switched call control at the “Q” reference point between Private Telecommunications Network Exchanges (PTNXs) connected within a Private Telecommunications Network (PTN). This protocol was adopted by the European Telecommunications Standards Institute (ETSI) and the International Standards Institute (ISO). Most of the major European PTNX manufacturers will be supporting ISDN connectivity based on this standard. QSIG is also supported in North America.

QSIG is oriented toward signaling and services that occur between two “peer-to-peer” switches across a “Q” reference point. For example, two PBXs, a PBX and a Centrex switch or two Centrex switches could exchange signaling and services across a “Q” reference point.

The ISDN QSIG Basic Call features introduces the following basic call services on Meridian 1 ISDN 1.5 MBit PRI on QSIG connectivities (these services were previously available only on ISDN 2.0 MBit PRI on QSIG connectivities, as introduced in Generic X11 Release 20):

- Basic Call Service
- 64 K clear bearer capability
- TIE call types
- Connected number delivery (COLP/COLR)
- Channel Negotiation
- Flexible numbering plan
- Enbloc dialing
- Calling Line Identification (CLIP/CLIR)

Operating parameters

Meridian Customer Defined Network (MCDN) features cannot be interworked between an MCDN and QSIG interface, with the exception of basic call, Calling Line Identification Presentation/Restriction and Calling and Connected Line Presentation/Restriction.

Meridian 1 accepts up to three Progress Information Elements (IE) in one message on the QSIG interface.

QSIG is supported on 1.5 Mbps PRI on Option 11C via the downloadable D-channel daughterboard.

The maximum length of a ISDN message is limited to 260 bytes.

Only circuit mode connection is supported.

nB+D is not supported for QSIG.

Hardware requirements

For 1.544 Mbps PRI on Option 11C, the NTAK09 PRI card and the NTBK51 downloadable D-channel daughterboard are required.

Feature interactions**Backup D-Channel**

Backup D-channel is not supported on the QSIG interface.

ISDN Signaling Link

ISDN Signaling Link (ISL) on QSIG operation is not supported on ISDN BRI trunking for Options 51C to 81C. For Option 11C, ISL on QSIG is not supported.

Network Attendant Services

ISDN QSIG Basic Call interacts with Network Attendant Services (NAS) as if the call is going to a route without NAS being equipped.

Network Automatic Call Distribution

Network Automatic Call Distribution signaling is not supported on the QSIG interface. Network ACD operation on QSIG is the same as the existing Network ACD treatment for unsupported interfaces.

Network Call Redirection

When a call is terminated on the Meridian 1 and Network Call Redirection (NCR) is active, the QSIG Basic Call can still operate; however, the original called number and redirection number IE that are used by NCR will not be sent on the QSIG interface.

Network Call Trace

Network Call Trace is not supported on the QSIG interface.

Network Calling Party Name Display

Network Calling Party Name Display (NCPND) is supported within the Meridian Customer Defined Network only. When QSIG is involved in the call setup, the existing NCPDN operation on unsupported interface applies on QSIG.

Network Message Service

Network Message Service (NMS) is only supported on the Meridian Customer Defined Network. NMS operation on QSIG is the same as the existing treatment for unsupported interfaces.

Network Ring Again

Network Ring Again signaling is supported within the Meridian Customer Defined Network only. Network Ring Again requests which go through the QSIG interface will not be supported.

Remote Virtual Queuing

Remote Virtual Queuing (RVQ) does not operate on the QSIG interface. The existing RVQ operation on unsupported interface applies on the QSIG interface.

Trunk Route Optimization

Trunk Route Optimization (TRO) is supported within an MCDN network only. When a redirecting node sends a message to the originating node and the TRO request is accepted, the new call will go through the QSIG interface just as a normal basic call. However, TRO signaling will not be able to operate on the QSIG interface.

Virtual Network Service

A QSIG link can be used as a B-channel for the Virtual Network Service (VNS) over a private network. All VNS services are supported as normal. QSIG is only used as a speech bearer.

Feature packaging

ISDN QSIG Basic Call (QSIG) is package 263. The following packages are also required:

- International Primary Rate Access (IPRA) package 202;
- Digit Display (DDSP) package 19; and
- Integrated Services Digital Network (ISDN) package 145;

Feature implementation

LD 17 – Assign Configuration Record.

Prompt	Response	Description
REQ	CHG	Change.
TYPE	ADAN	Action Device and Number.
- ADAN	CHG DCH x	Change input/output device.
...		
-- IFC	ISIG	Interface ID for ISO QSIG download table.
...		
TIMR	(NO), YES	NO = skip timer prompt. YES = change timer value.
T310	110 - (120)	The timer is used to define how long Meridian 1 can wait for the response message when the QSIG outgoing call is in an outgoing call proceeding state.

LD 16 – Define Route Data Block.

Prompt	Response	Description
REQ	NEW, CHG	New, or Change.

TYPE	RDB	Route Data Block.
...		
DGTP	PRII	Digital Route Type
IFC	ISIG	New DCH interface identification as entered in LD 17.

LD 97 – System Configuration.

Prompt	Response	Description
REQ	CHG	Change.
TYPE	SYSM	System parameters for Multi-purpose Serial Data Link (MSDL) or Multi-purpose ISDN Signaling Processor (MISP).
...		
FDLC	p1 p2 p3 p4	Fast download control parameters. p1 = Application will be set to PRIE or BRIE. p2 = Specifies conditional (C) or forced downloading (F). p3 = Specifies current (C), latest (L) and specified (S) version. p4 = xx (version number if p3 = S).

Feature operation

No specific operating procedures are required to use this feature.

ISDN QSIG Call Completion

The ISDN QSIG Call Completion feature expands Ring Again functionalities on QSIG interfaces. This feature provides Call Completion to Busy Subscriber (CCBS) and Call Completion on No Response (CCNR) supplementary services.

The Call Completion to Busy Subscriber (CCBS) supplementary service allows the calling party to apply a Ring Again request when encountering a busy Directory Number (DN). The Meridian 1 alerts the calling party when occupied DN is available to receive a call. The calling party has the option of completing this call without making a new call attempt. [CCBS is supported on QSIG signalling protocols.](#)

Call Completion on No Response (CCNR) supplementary service allows the calling party to apply a Ring Again request to an unanswered DN. With this service, the Meridian 1 alerts the calling party when the dialed DN becomes idle after a period of activity. The calling party has the option of completing the call without making a new call attempt. [CCNR is only supported on QSIG signalling protocols.](#)

Operating parameters

ISDN QSIG Call Completion supports Uniform Dialing, Customer Dialing and Group Dialing plans.

Since the Ring Again feature is configured on set level basis, either by Class of Service or Ring Again key, a set cannot be programmed with CCBS on Meridian Customer Defined Network (MCDN) Network Ring Again allowed. Ring Again is allowed or denied locally or network wide in the same manner.

ISDN QSIG is supported in ETSI compliant countries.

This feature uses QSIG GF and ETSI GF platforms.

Call Completion on No Response (CCNR) on a QSIG network is not supported on Analog (500/2500 type) sets.

Call Completion to Busy Subscriber and Call Completion on No Response are not supported on ISDN BRI sets.

A PINX (Private Integrated Services Network Exchange) DN must be configured in the Customer Data Block (LD 15). The PINX DN is used for routing free notification on the MCDN. The DN configured should be consistent with the type of number plan used. PINX DN is also used for incoming Direct Inward Dialing (DID) calls in the same manner as Listed Directory Number 0 (LDN0) is used for a basic call.

Feature interactions

Access Restrictions

Call Restriction

Trunk Group Access Restrictions

ISDN QSIG Call Completion does not override Access, Call Restriction or Trunk Group Access restrictions. When Call Completion is activated, the second call has the same restrictions as the initial call that received either no answer or a busy indication.

Attendant Consoles

Call Completion requests cannot be directed to or from an Attendant Console.

Automatic Call Distribution

Call Completion requests cannot be directed to or from Automatic Call Distribution (ACD) Directory Numbers (DNs).

An ACD set that uses a normal DN key (not the ACD key) can activate the Ring Again key when encountering a busy or no answer situation.

Call Detail Recording

A Call Detail Recording (CDR) is not produced for Call Completion signaling. The second call receives a CDR as a normal call.

Call Forward All Types

When the Call Forward feature is activated on a local basis and an incoming Call Completion request is received, the Call Completion request is registered against the forwarded DN.

Call Transfer

Call Completion notification is only presented to the Call Completion originating set. This notification cannot be transferred to another station. Once the second call is completed, the call can be transferred.

If a user encounters a busy or no answer situation during a transfer operation, Call Completion can be activated.

Call Waiting

On an Analog (500/2500 type) set, Call Completion notification waits until the set has finished an active call. If Call Waiting is configured on a set, notification is presented after the Call Waiting call. If an additional call is queued while Ring Again free notification is waiting on a set, the waiting call takes precedence over the Call Completion notification. An established Call Completion call is also queued if a set has Call Waiting feature equipped and is occupied on another call.

Conference

A Call Completion request cannot be made on a conference call attempt.

Direct Inward System Access

Call Completion on Busy Subscriber (CCBS) and Call Completion No Response (CCNR) are not supported on Direct Inward System Access (DISA) calls when the call destination is busy.

Do Not Disturb

An incoming notification overrides a set with Do Not Disturb (DND) activated. Call Completion requests can be applied to sets with the DND feature activated. However, this request does not advance until the DND feature is deactivated.

Flexible Feature Codes

Analog (500/2500 type) set can use Flexible Feature Codes (FFCs) to activate Call Completion to Busy Subscriber requests.

Group Call

Call Completion cannot be applied to a Group Call.

Group Hunt

Call Completion to Busy Subscriber cannot be applied to Pilot DN when no idle set is located during a Group Hunt call.

Hot Line

Call Completion cannot be used in conjunction with the Hot Line feature.

Maintenance Busy

Call Completion on Busy Subscriber is not accepted against a set in Maintenance Busy state.

Make Set Busy

Sets that have Make Set Busy (MSB) activated can request Call Completion to another DN, as the free notification overrides the MSB feature. Incoming Call Completion to Busy Subscriber (CCBS) requests do not override the MSB feature. A set is considered busy while MSB is active. A CCBS request is registered against a busy set, but only advances when the MSB feature is deactivated and the set remains free.

Permanent Hold

Analog (500/2500 type) sets with Permanent Hold cannot use the Ring Again functionalities.

Ring Again**Ring Again No Answer**

Analog (500/2500 type) sets can have only one Call Completion to Busy Subscriber request at a given time. Meridian 1 proprietary sets can make Ring Again requests based on the number of Ring Again keys programmed on a set.

Feature packaging

ISDN QSIG Call Completion (QSIG-SS) is package 316. The package dependencies for QSIG-SS are:

- Optional Features (OPTF) package 1; and
- ISDN QSIG GF Transport (QSIGGF) package 305.

Depending on the application, the following packages are also required.

For the QSIG ISDN PRI interface:

- Digit Display (DDSP) package 19;
- Coordinated Dialing Plan (CDP) package 59;
- Integrated Services Digital Network (ISDN) package 145;
- 1.5 Mbps Primary Rate Access (PRA) package 146;
- Flexible Numbering Plan (FNP) package 160;
- Multipurpose Serial Data Link (MSDL) package 222; and
- QSIG Interface (QSIG) package 263.

Feature implementation

LD 17– Configure Remote Capabilities to Call Completion for the QSIG interface.

Prompt	Response	Description
REQ	CHG	Change.
TYPE	ADAN	Configuration Record.
- ADAN	CHG DCH x	Change D-channel.
...		
- IFC	ISGF	Interface type for route where ISGF = Interface ID for ISO QSIG with GF capability
...		
- RCAP	CCBS	Add Call Completion to Busy Subscriber as remote capability.
- RCAP	CCNR	Add Call Completion No Response. This prompt is only applicable to QSIG interfaces.

LD 10 – Add or Change Ring Again on Analog (500/2500 type) telephones.

Prompt	Response	Description
REQ:	CHG, NEW	Change, or Add.
TYPE:	500	Telephone type.
TN	c u	Terminal Number.
...		
CLS	XRA	Ring Again allowed. XRD = Ring Again denied (default).

LD 11 – Add or Change Ring Again on Meridian 1 proprietary telephones.

Prompt	Response	Description
REQ:	CHG, NEW	Change, or Add.
TYPE:	aaaa	Telephone type where aaaa = SL1, 2006, 2008, 2009, 2016, 1018, 2112, 2216 2317, 2616 or 3000.
TN	c u	Terminal Number.
...		
KEY	xx RGA	Assign Ring Again key where xx = key number. On M2317 and M3000 telephones xx = 27.

LD 57 – Define Ring Again Flexible Feature Codes (FFCs) and FFC Confirmation Tone.

Prompt	Response	Description
REQ	CHG	Change.
TYPE	FFC	Flexible Feature Code.
CUST	xx	Customer number.
FFCT	YES	Confirmation tone provided after FFC is activated. NO = Confirmation tone not provided.
CODE	RGAA	Ring Again activate.
RGAA	xx	Ring Again code.
CODE	RGAD	Ring Again deactivate.
RGAD	xx	Ring Again deactivation code.
CODE	RGAV	Ring Again verification.
RGAV	xx	Ring Again verification code.

LD 15 – Configure a Private Integrated Services Network Exchange (PINX) DN.

Prompt	Response	Description
REQ:	CHG	Change.
TYPE:	NET	Networking.
CUST	xx	Customer number.
- PINX_DN	xx...x	Node DN to a maximum of seven digits with DN extension.

Feature Operation

Call Completion on Busy Subscriber

Meridian 1 Proprietary Sets

- 1 Set A calls Set B on an outgoing QSIG route and receives a busy indication.
- 2 Before releasing this call, Set A presses the Ring Again key (RGA) to activate Ring Again functionality. The DN lamp flashes.
- 3 When the far end receives a Call Completion on Busy Subscriber (CCBS) request, Set A's RGA lamp key is steadily lit, and the DN lamp darkens.
- 4 Set A awaits notification that Set B is free. Set A can make or receive calls while waiting for notification.
- 5 When Set B goes on-hook, Set A is notified in the form of a one second burst of ringing and the RGA key lamp fast flashes.
- 6 The recall is accepted by selecting the DN key and pressing the RGA key. Set A has thirty seconds to accept the recall before it is cancelled.
- 7 If Set A accepts the recall and Set B is free, the call is rung. However, if Set B has either received or originated another call, Set A receives a busy indication. Set A has the option of requesting CCBS again.

Note: If Set A presses the RGA key before receiving notification then the request is cancelled.

Analog (500/2500 type) sets without RGA key

- 1 Set A calls Set B on an outgoing QSIG route and gets a busy indication.
- 2 Set A performs a switch-hook flash and a special dial tone is heard.
- 3 Set A dials RGA Activate Flexible Feature Code (FFC) or SPRE +1 to activate CCBS feature. This request cancels and replaces previous RGA Activate requests.
- 4 If an FFC is dialed, an FFC confirmation tone if programmed indicates that the CCBS request is registered.
- 5 Set A goes on-hook and is free to make or receive other calls.
- 6 When Set B goes on-hook, Set A receives a burst of tone and has thirty seconds to accept the recall before it is cancelled.
- 7 If Set B has originated or received another call, Set A receives a busy indication and has the option of requesting the CCBS again.

Note: If Set A presses the RGA key before receiving notification then the request is cancelled.

Call Completion No Response***Meridian 1 Proprietary Sets***

- 1 Set A calls Set B on an outgoing QSIG route. The call rings but is not answered. Set A receives a ringback tone.
- 2 Set A presses RGA key to activate Ring Again on No Answer prior to releasing the call. The DN key lamp darkens.
- 3 Set A goes on-hook and is free to make or receive calls.
- 4 When Set B makes a call and goes on-hook. Set A is notified by a one second burst of tone and the RGA lamp fast flashes.
- 5 Set A can accept the call by selecting a DN key and pressing the RGA key. Set A has thirty seconds to accept this call.
- 6 If Set A accepts the call and Set B is free, the call goes through. However, if Set B receives or originates another call, Set A receives a busy indication. Set A has the option of requesting CCBS.

Note: If Set A presses the RGA key before receiving notification then the request is cancelled.

ISDN QSIG Call Diversion Notification

ISDN QSIG Call Diversion Notification allows the Meridian 1 to provide notification to the originating calling party and forwarded-to (diverted) party when a call is forwarded over an ISDN QSIG private network. With this feature, call diversion is invoked by the following triggers:

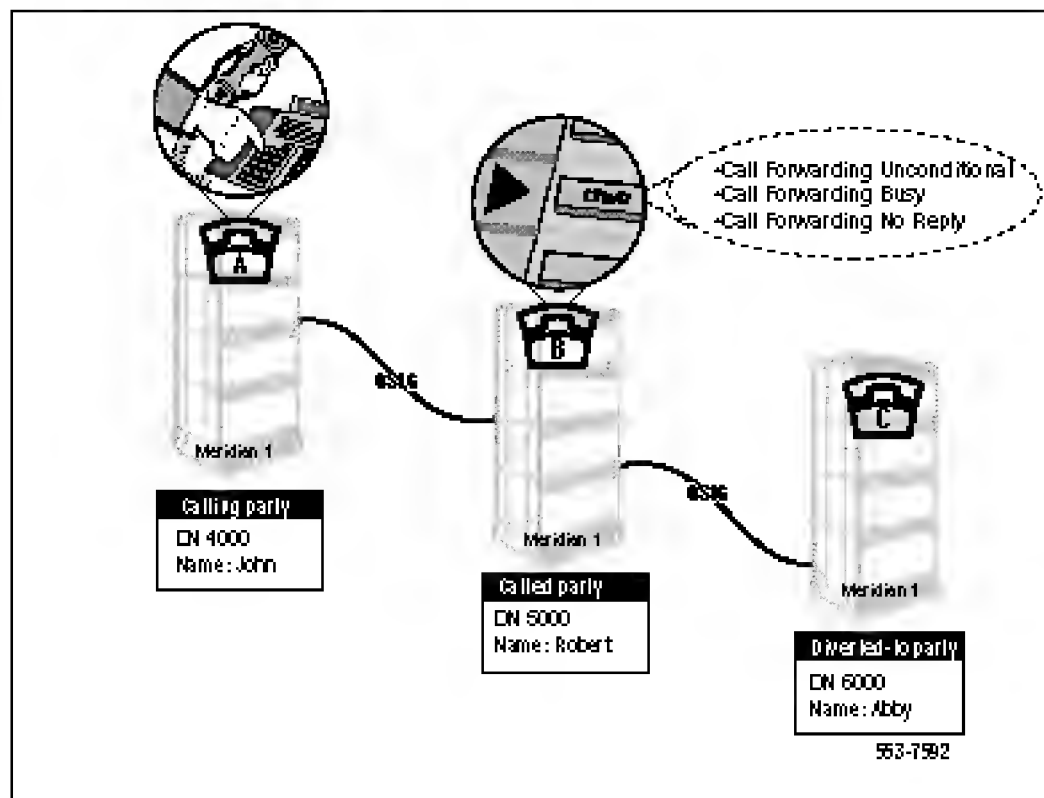
- Call Forwarding Busy (CFB) - the called set is in use
- Call Forwarding No Reply (CFNR) - the called set does not answer after a given number of rings
- Call Forwarding Unconditional (CFU) - the called set is forwarded as soon as the set is reached

With this feature, notification can be provided to the calling party and the forwarded-to (diverted) party that call diversion has occurred. When provisioned, call diversion notification is displayed on the calling party's set and on the forwarded-to (diverted) party's set according to the existing terminal display configuration.

Diversion notification provided to the calling and forwarded-to (diverted) party depends on the subscription options (Class of Service) configured on the called party's set. The called party can configure two diversion options. One Class of Service option is applicable to the calling party and the other option is applicable to the forwarded-to (diverted) party. These new Classes of Service determine if call diversion notification is provided to the calling party and the forwarded-to party and what type of diversion information these parties receive.

Figure 5 shows an example of a Call Diversion environment.

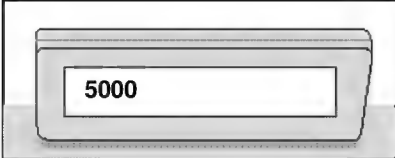
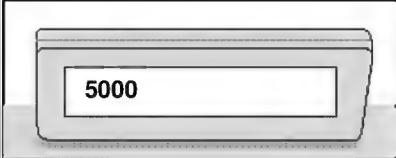
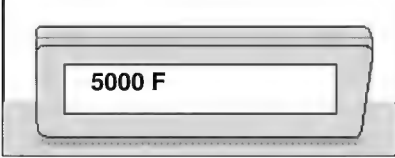
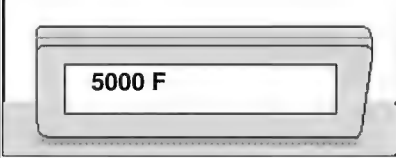
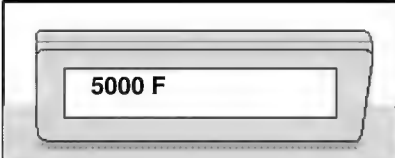
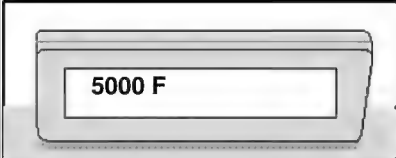
Figure 5
Call Diversion Environment



Calling Party's Notification

The calling party that originates the call receives notification of call diversion depending on the configuration of the called party's set. As shown in [Table 3](#), the called party configures one of the three possible Classes of Service.

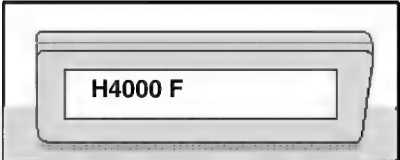
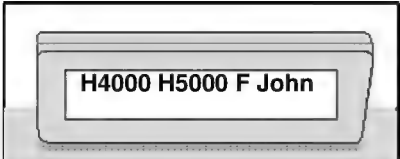
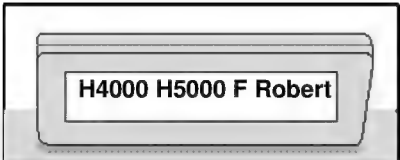
Table 3
Calling Party's Notification

Called Party's Diversion Subscription Options (Class of Service)	Calling Party's Display when call is forwarded.	Forwarded-to Party's Display
CLS = DNO1 No diversion notification provided to calling party.		
CLS = DNO2 Diversion notification provided without forwarded-to (diverted) party's number and name.		
CLS = DNO3 (default) Diversion notification provided with forwarded-to (diverted) party's number and name when available.		

Called Party's Notification

The forwarded-to (diverted) party receives notification of call diversion depending on the configuration of the called party's set. As shown in [Table 4](#), the called party configures one of the two possible Classes of Service.

Table 4
Forwarded-to Party's Notification

Called Party's Diversion Subscription Options (Class of Service)	Forwarded-to Party's Display.	Forwarded-to Party's Class of Service
DNDN = No Called party's number and name are not released to the forwarded-to (diverted) party.		DNDD = Dialed Name Display Denied (default)
DNDY = Yes (default) Called party's number and name are released to forwarded-to (diverted) party.		DNDD = Dialed Name Display Denied (default)
DNDY = Yes (default) Called party's number and name are released to forwarded-to (diverted) party.		DNDA = Dialed Name Display Allowed

On the forwarded-to (diverted) party's set, the Dialed Name Display Allowed/Denied (DNDA/DNDD) Class of Service allows the forwarded-to (diverted) party to choose the name displayed after call diversion. If the forwarded-to (diverted) party configures a Dialed Name Display Allowed (DNDA) Class of Service their display shows one of the following:

- the original called party's name when available; or
- if the original called party's name is not available, the redirecting name when available; or
- if neither of the two previous names are available, then nothing is displayed.

If the forwarded-to (diverted) user has configured a Dialed Name Display Denied (DNDD) Class of Service then the calling party's name is displayed if available. Otherwise, nothing is displayed.

Operating parameters

A Meridian 1 user cannot remotely activate or deactivate QSIG Call Diversion Notification from either a Meridian 1 or on another third party Private Branch Exchange (PBX).

As per the current operation of the Call Forward features, the Meridian 1 does not provide any indication, such as an LED, on the called party's set that call diversion has been activated.

The validity of the forwarding number is not supported. If an invalid forwarding directory number is dialed no verification is provided by the system.

The calling party is notified each time a call redirection occurs, provided this information is supplied by the network. If previous call diversion notification is provided, then it is replaced by last received. If call redirection occurs and no call redirection information is provided by the network, then any notification information that has previously been provided remains unchanged.

When a call redirection occurs no call diversion information is provided by the network. However, if a previous notification has been provided then the call diversion information remains unchanged.

The maximum allowable size of QSIG name information is 50 characters. With the Call Party Name Display feature, only 27 characters string length is supported. Accordingly, names processed by the Meridian 1 may be truncated.

Across a network, it is not possible to prevent reciprocal Call Forward from occurring. However, the capabilities of the Flexible Orbiting Prevention Timer and Total Redirection Count features can be used.

QSIG Call Diversion Notification requires Coordinated Dialing Plan (CDP) or Uniform Dialing Plan (UDP). Digit manipulation is not supported.

Interworkings with Meridian Customer Defined Network (MCDN) call redirection and QSIG Call Diversion Notification is not supported.

Interaction with Meridian Mail and this feature is not supported.

Feature packaging

QSIG Call Diversion Notification is ISDN QSIG Supplementary Service - Call Completion (QSIG-SS) package 316 which has the following dependencies:

- QSIG Interface (QSIG) package 263
- Calling Party Name Display (CPND) package 95
- Digit Display (DDSP) package 19
- ISDN QSIG-GF Transport (QSIG-GF) package 305
- Coordinated Dialing Planing (CDP) package 59 or Uniform Dialing Plan (UDP) package 58

On a 1.5 Mbps PRI interface the following packages are required:

- Integrated Services Digital Network (ISDN) package 145
- Multipurpose Serial Data Link (MSDL) package 222

Feature implementation

The QSIG Call Diversion Notification feature requires the configuration of one of the following call redirection features: Call Forward All Calls, Call Forward/Hunt Override Via Flexible Feature Codes, Call Forward Remote (Attendant and Networkwide), Call Forward No Answer/Flexible Call Forward No Answer, Call Forward No Answer Second Level, Call Forward Internal Calls and User Selectable Call Redirection. The implementation of these features is not modified.

Remote Capability Meanings

Table 5 indicates the remote capabilities meanings for D-channel routes. When using Table 5 consider the following:

- Only nodes subject to be Originating, Served, Diverted or Rerouting nodes with respect to QSIG Call Diversion Notification need to have diversion remote capability configured. Transmit nodes pass the information transparently.
- When choosing the Operation Coding Choice, the interface type should be considered. When the QSIG interface used is ISO (IFC ISGF), operations are mostly coded with Integer Values.

Only one remote capability allows the QSIG Diversion configuration on a D-channel route. This remote capability gathers the three following possibilities for the D-channel route:

- 1 coding of operations sent to the remote switch, which can be coded as either as Object Identifier or as Integer Value. If coded as Object Identifier, the remote capability ends with an 'O', whereas for Integer Value, the remote capability ends with an 'I'. This means that remote capabilities explained below in 2 and 3 are defined twice.
- 2 sending of QSIG Diversion Notification Information to the remote switch: this information is sent only if the remote capability is of first or third type, i.e. DV1x or DV3x, where the x is either 'I' or 'O' as explained in 1.
- 3 treatment of Rerouting requests received from the remote switch: a rerouting request is only processed if the remote capability is of second or third type, i.e. DV2x or DV3x, where x is either 'I' or 'O' as explained above in 1.

Table 5
Remote Capability Meanings

Remote capability	Meaning for Operation Coding	Meaning for Notification Information	Meaning for Rerouting request
None of the following remote capabilities.	Not applicable (nothing sent)	Not <u>sent</u>	Not processed when <u>received</u>
DV1O	<u>Sent</u> coded as Object Identifier	<u>Sent</u>	Not processed when <u>received</u>
DV1I	<u>Sent</u> coded as Integer Value		
DV2O	<u>Sent</u> coded as Object Identifier	Not <u>Sent</u>	Processed when <u>received</u>
DV2I	<u>Sent</u> coded as Integer Value		
DV3O	<u>Sent</u> coded as Object Identifier	<u>Sent</u>	Processed when <u>received</u>
DV3I	<u>Sent</u> coded as Integer Value		

LD 17 – Configure or remove remote capabilities D-channel for QSIG Call Diversion Notification.

Prompt	Response	Description
REQ:	CHG	Change existing data.
TYPE:	ADAN	Action device and number.
ADAN	CHG DCH x	Configure new remote capabilities on D-channel x.
...		
IFC	ISGF	QSIG Interface ID for ISO with GF capability.
...		
RLS	23	Release 23 and later.
...		
RCAP		QSIG SS Call Diversion Notification remote capability. Configure sending of QSIG Diversion Notification Information, treatment of Rerouting request and coding of operations. If coded as Object Identifier, the remote capability ends with 'O', whereas for Integer Value, the remote capability ends with 'I'. Only one remote capability is allowed. Refer to Table 1 for further information.
	DV1I	Diversion information is sent to remote switch.
	DV1O	Diversion information is sent to remote switch.
	DV2I	Rerouting requests from remote switch are processed.
		Rerouting requests from remote switch are processed.
	DV2O	Diversion information is sent to remote switch. Rerouting requests from remote switch are processed.
		Diversion information is sent to remote switch.
	DV3I	Diversion information is sent to remote switch.
	DV3O	Rerouting requests from remote switch are processed.
		Precede with 'X' to remove capability.

LD 16 – Configure Remote Capability for a QSIG ISGF interface.

Prompt	Response	Description
REQ	CHG	Change existing data.
TYPE	RDB	Route Data Block.
CUST	xx	Customer number.
ROUT	0 - 511 0-127	Route Number. For Option 11C.
...		
IFC	ISGF	QSIG Interface ID for ISO with GF capability.
...		
RCAP		QSIG SS Call Diversion Notification remote capability. Configure sending of QSIG Diversion Notification Information, treatment of Rerouting request and coding of operations. If coded as Object Identifier, the remote capability ends with 'O', whereas for Integer Value, the remote capability ends with 'I'. Only one remote capability is allowed. Refer to Table 1 for further information.
	DV1I	Diversion information is sent to remote switch.
	DV1O	Diversion information is sent to remote switch.
	DV2I	Rerouting requests from remote switch are processed.
		Rerouting requests from remote switch are processed.
	DV2O	Diversion information is sent to remote switch. Rerouting requests from remote switch are processed.
	DV3I	Diversion information is sent to remote switch.
	DV3O	Rerouting requests from remote switch are processed.
		Precede with 'X' to remove capability.

LD 10 – Configure QSIG Diversion Notification on analog (500/2500 type) telephones

Prompt	Response	Description
REQ:	NEW CHG	Add new data. Change existing data.
TYPE:	500	Telephone type.
...		
TN	I s c u c u	Terminal Number. For Option 11C.
...		
DN	x...x yyy	Directory Number and Calling Line Identification entry (Range is (0) - value entered for SIZE prompt in LD 15 minus one).
...		
- CPND	aaa	Calling Party Name Display where: NEW = Add data block. CHG = Change existing data block. OUT = Remove existing data block.
- -CPND_LANG	aaa	Calling Party Name Display Language where: (ROM) = Roman. KAT = Katakana.
- - NAME	aaaa bbbb	Calling Party Name Display Name where: First name Last name.
...		
CLS	(DNO3) DNO1 DNO2	QSIG Call Diversion Notification options for calling party. Notification with diverted-to party's number and name. No notification. Notification without diverted-to party's number and name.

	(DNDY) DNDN	QSIG Call Diversion Notification options concerning forwarded- to party. Notification with Called party's number and name. Notification without Called party's number and name.
	CNDA	Call Party Name Display Allowed
	CFXA	Call Forward to External DN Allowed.
	CFTA	Call Forward by Call Type Allowed.
	DDGA	Directory Number Display on other set Allowed.
	FNA	Call Forward No Answer Allowed.
	HTA	Hunting Allowed.
	NAMA	Name Display on other set Allowed or (Denied).

LD 11– Configure QSIG Diversion Notification on Meridian 1 proprietary telephones.

Prompt	Response	Description
REQ:	NEW CHG	Add new data. Change existing data.
TYPE:	xxxx	Telephone type, where: xxxx = SL1, 2006, 2008, 2009, 2016, 2018, 2112, 2216, 2317, 2616 or 3000.
...		
TN	I s c u c u	Terminal Number. For Option 11C.
...		
FDN	x...x	Flexible Call Forward No Answer DN for an Internal Directory Number.
...		
CLS	(DNO3) DNO1 DNO2	QSIG Call Diversion Notification options for calling party. Notification with diverted-to party's number and name. No notification. Notification without diverted-to party's number and name.
	(DNDY) DNDN	QSIG Call Diversion Notification options concerning forwarded- to party. Notification with Called party's number and name. Notification without Called party's number and name.
	CNDA	Call Party Name Display Allowed
	CFXA	Call Forward to External DN Allowed.
	CFTA	Call Forward by Call Type Allowed.
	DDGA	Directory Number Display on other set Allowed.
	FNA	Call Forward No Answer Allowed.
	HTA	Hunting Allowed.
	NAMA	Name Display on other set Allowed or (Denied).

...		
RCO	(0) - 2	Ringing Cycle Option for Call Forward No Answer.
EFD	x...x	Call Forward No Answer Directory Number for external calls
...		
- CPND	aaa	Calling Party Name Display where: NEW = Add data block. CHG = Change existing data block. OUT = Remove existing data block.
- -CPND_LANG	aaa	Calling Party Name Display Language where: (ROM) = Roman. KAT = Katakana.
- - NAME	aaaa bbbb	Calling Party Name Display Name where: First name Last name.

LD 95 – Modify Call Party Name Display data block.

Prompt	Response	Description
REQ	CHG	Change existing data.
TYPE	CPND	Call Party Name Display data block.
CUST	xx	Customer number.
...		
RESN	YES	Display Redirection reason allowed. (NO) = Display Redirection reason denied (default).
- CFWD	aaaa	Mnemonic for Call Forward All Call display. (F) = default
- CFNA	aaaa	Mnemonic for Call Forward No Answer display (N) = default.
- HUNT	aaaa	Mnemonic for Call Forward Busy display. (B) = default

LD 95 – Define Name for telephones.

Prompt	Response	Description
REQ	NEW	Add new data.
TYPE	NAME	Name.
CUST	xx	Customer number.
...		
DN	x..x	Directory Number.
- NAME	a..a	Calling Party Name Display in ASCII characters.

LD 11 – Configure the name that is to be displayed on the Forwarded-to (diverted) Party's set.

Prompt	Response	Description
REQ	CHG	Change existing data.
TYPE	xxxx	Telephone type, where: xxxx = SL1, 2006, 2008, 2009, 2016, 2018, 2112, 2216, 2317, 2616 or 3000.
TN	I s c u c u	Terminal Number. For Option 11C.
...		
CLS	DNDA	Dialed Name Display Allowed. (DNDD)= Dialed Name Display Denied (default).

Note: LD 81 may be used to print counting or listing queries pertaining to the new Classes of Service, by entering CNT or LST against the REQ prompt, and the appropriate COS against the FEAT prompt.

Note: LD 83 may be used may be used to print the new Classes of Service in the TN blocks, by entering TNB against the REQ prompt, and the appropriate COS against the CLS prompt.

Feature operation

No specific operating procedures are required to use this feature.

ISDN QSIG Generic Functional Transport

This feature provides a generic transport platform that will support QSIG compliant supplementary services and ISDN networking applications on a Private Integrated Services Digital Network (PISN), in accordance with the International Standards Organization (ISO) and the European Telecommunication Standards Institute (ETSI.)

ISDN QSIG GF Transport is supported on the following interfaces with the D-channel configured as International Standards Organization (ISO QSIG):

- ISDN 1.5 Mbps Primary Rate Interface (PRI); and
- ISDN Signaling Link (ISL).

Operating parameters

DN address translation requires the association with a customer number. For PRI, a prompt creates a customer number association with a given D-channel.

Feature interactions

There are no interactions with other features.

Feature packaging

ISDN QSIG GF Transport (QSIGGF) is package 305.

QSIG on 1.5 Mbps ISDN PRI interface requires the following packages:

- QSIG Interface (QSIG) package 263;
- QSIG GF Transport (QSIGGF) package 305;
- Integrated Services Digital Network (ISDN) package 145;
- 1.5 Mbps Primary Rate Access (PRA) package 146; and
- Multi-purpose Serial Data Link (MSDL) package 222.

ISDN Signaling Link (ISL) interface requires the following packages:

- QSIG Interface (QSIG) package 263; and
- QSIG GF Transport (QSSIGF) package 295;

- Integrated Service Digital Network Signaling Link (ISL) package 147; and
- Multi-purpose Serial Data Link (MSDL) package 222.

For ISL shared mode:

- Integrated Services Digital Network (ISDN) package 145; and
- 1.5 Mbps Primary Rate Access (PRA) package 146.

Feature implementation

LD 16 – Configure Automatic Trunk Maintenance in Route Data Block.

Prompt	Response	Description
REQ	NEW, or CHG	New, or change.
TYPE	RBD	Route Data Block.
...		
DGTP	PRI	Digital Route type.
IFC	ISGF	ISGF = ISO QSIG interface with GF platform. The ESIG and ISIG prompt can be entered if both QSIG and QSIGGF packages are included.

LD 17 – Configuration Record.

Prompt	Response	Description
REQ	CHG	Change.
TYPE	CFN	Configuration Record.
ADAN	aaa aaa x	Add, Move or Change Input/Output Device
...		
- IFC	ISGF	ISGF = ISO QSIG interface with GF platform.

PINX-CUST	0-99	Customer number.
ISDN_MCNT	60-(300)-350	Layer 3 call control message count five per second time interval.

Feature operation

No specific operating procedures are required to use this feature.

ISDN QSIG Name Display

The Integrated Services Digital Network (ISDN) Q Reference Signaling Point (QSIG) Name Display feature provides three supplementary services pertaining to the calling or connected party name display. These supplementary services allow the calling/connected party to either present or restrict the display of name identification on an ISDN PRI link. ISDN QSIG Name Display feature supports the following services:

- Calling Name Identification Presentation (CNIP),
- Connected Name Identification Presentation (CONP), and
- Calling/Connected Name Identification Restriction (CNIR).

Calling Name Identification Presentation

Calling Name Identification Presentation (CNIP) service is available to the called/connected party. When this service is enabled, the calling party's name is displayed on the connected party's set. CNIP service is available on a permanent basis only, and requires the calling party to have the Class of Service Name Presentation Allowed, defined in LD 10 or LD 11.

Connected Name Identification Presentation

Connected Name Identification Presentation (CONP) is a service available to the calling party. When this service is enabled, the called/connected party's name is displayed on the calling party's set. CONP is provided on a permanent basis only and requires the called/connected party to have the Class of Service Name Presentation Allowed, defined in LD 10 or LD 11.

Calling/Connected Name Identification Restriction

Calling/Connected Name Identification Restriction (CNIR) prevents the calling/connected party's name from being presented to a called/calling party. CNIR is invoked on either a permanent basis, provided the calling/connected party has a Class of Service Name Presentation Denied defined in LD 10 or LD 11, or on a per-call basis. When CNIR is activated on a per-call basis, the Class of Service Name Presentation Allowed is configured, and Calling Party Privacy (CPP) Flexible Feature Code (FFC) is dialed prior to initiating a call. This supplementary service restricts presentation of the calling/connected party's name during a normal call establishment and also when the possibility of name presentation arises from the operation of other features, such as Call Transfer, Call Forwarding or Hunting.

Operating parameters

ISDN QSIG Name Display feature requires the QSIG General Functional (GF) transport platform. QSIG GF protocols provide name information that is contained in the facility information element. This protocol transports call control messages from one network to another.

Fifty characters string length is the maximum allowable size of name display information for QSIG. The Call Party Name Display (CPND) feature accepts 27 characters string length. If a name display exceeds these parameters, the name is truncated on the receiving set.

Interworking with existing Meridian Customer Defined Network (MCDN) Name Display feature is dependent upon the remote capability of the associated D-channel defined in LD 17 for PRI routes.

Individual service profiles cannot override Calling Name Identification Restriction requests. Therefore, when name display information has been restricted, it is not possible to obtain this information on the display of the set.

For ISDN BRI sets to have the capability to activate Calling/Connected Name Identification Restriction (CNIR) on a permanent basis, the PRES prompt in LD 27 must be defined PRES = NO.

Calling Party Privacy (CPP) Flexible Feature Codes (FFC) is not supported on BRI sets. Therefore, CNIR on a per-call basis is not supported on BRI sets.

Calling/Connected Name Identification Restriction (CNIR) takes precedence over Calling Name Identification Presentation (CNIP) and Connected Name Identification Presentation (CONP) services.

Feature interactions

Call Modification

If an incoming QSIG with name display presentation allowed receives call modification treatment, such as Call Pickup, Call Transfer, Conference, Call Forward All Types or Hunt, the reason for call modification is not displayed on the calling party's set. Name display information is not updated on the calling party's set. However, if a CONNECT message is sent, the calling party's name display is updated on receipt of this message.

Call Pickup

An incoming QSIG call with name display presentation allowed has name information displayed on the set that picks up the call. If the incoming QSIG call has presentation denied, the calling party's name is not displayed on the set picking up the incoming call.

Call Pickup Network Wide

When a QSIG call with name display presentation allowed is picked up on a MCDN, the calling party's name information is displayed on the set that answers the call. If presentation restricted is defined, then name information is not displayed.

Call Transfer

After the completion of a call transfer, an incoming QSIG call with name display presentation allowed has name information displayed on the destination set. If the incoming QSIG call has presentation denied, name information is not displayed to the destination set.

Call Transfer Network Wide

When a QSIG call with name display presentation allowed is transferred over a MCDN, the calling party's name information is displayed on the set that answers the call. If presentation restricted is defined, then name information is not displayed.

Conference**Conference Network Wide**

An incoming QSIG call with name display presentation allowed is conferenced locally. When a conferee drops out of the conference, calling party's name information is displayed and is passed on to another conferee. Name display information remains until the last local set remains on the call. With presentation restricted, the calling party's name information is not displayed as conferees leave the call.

Call Forward All Calls

When an incoming QSIG call, with name display presentation allowed Name Display, is forwarded locally, the calling party's name information is displayed on the forwarding set. With presentation restriction, the calling party's name information is not displayed to the destination set.

Call Forward All Calls - Network Wide

When a QSIG call with name display presentation allowed is forwarded over a MCDN, the calling party's name information is displayed on the forwarded set. If presentation restricted is defined, then name information is not displayed on the destination set.

Call Party Name Display**Calling Party Name Display Denied**

Call Party Name Display and Calling Party Name Display Denied interact with ISDN QSIG Name Display, depending on the Name Display configuration in LD 17 for PRI. When a QSIG network is interacting with an MCDN network providing network capability ND3, both the MCDN and QSIG Name Display feature function on the same level.

Calling Party Privacy

Calling Party Privacy (CPP) takes precedence over the ISDN QSIG Name Display feature.

Hunting

When an incoming QSIG call with name display presentation allowed is hunted locally, the calling party's name information is displayed on the destination set. With presentation restriction, the calling party's name information is not displayed.

Hunting - Network Wide

When a QSIG call with name display presentation allowed is forwarded over a MCDN, the calling party's name information is displayed on the forwarded set. If presentation restricted is defined, then name information is not displayed on the forwarded set.

Incoming DID Digit Conversion

Incoming DID Digit Conversion Network Wide

IDC trunk and name information is passed and displayed to the terminating party when no name information is received from the Direct Inward Dial (DID) trunk. The Incoming DID Digit Conversion (IDC) feature is activated, and name information is associated with the converted digit sequence.

Name information received from a DID trunk takes precedence over an IDC trunk name.

Feature packaging

ISDN QSIG Name Display requires the following packages:

- Calling Party Name Display (CPND) package 95;
- Digit Display (DDSP) package 19;
- Calling Party Privacy (CPP) package 301; and
- Flexible Feature Codes (FFC) package 139.

The following packages are required for 1.5 Mbps ISDN PRI QSIG interface:

- ISDN QSIG Basic Call (QSIG) package 263;
- QSIG GF Transport (QSIGGF) package 305;
- Integrated Services Digital Network (ISDN) package 145;
- 1.5 Mbps Primary Rate Access (PRA) package 146; and

- Multi-purpose Serial Data Link (MSDL) package 222.

Feature implementation

LD 95 – Modify the Call Party Name Display (CPND) data block.

Note: Call Party Name Display is also defined at the set level in either LD 10 or LD 11 depending on type of set.

Prompt	Response	Description
REQ	NEW	Create Call Party Name Display data block.
TYPE	CPND	Call Party Name Display data block.
CUST	xx	Customer number.
....		
REQ	NEW	Create new name strings.
TYPE	NAME	Name Strings.
CUST	xx	Customer number.
...		
DN	xxxx	Directory Number.

LD 10 – Define Class of Service Name Display Allowed on Analog (500/2500 type) sets.

Prompt	Response	Description
REQ:	NEW, CHG	Add, or Change.
TYPE:	500	Type of telephone.
CUST	xx	Customer number.
...		
CLS	CNDA	Called Party Number Display Allowed. Allows called/connected party name to be viewed by calling party. (CNDD) = Call Number Display Denied (default).

CLS	NAMA	Name Display Allowed on the far end. (NAMD) = Name Display Denied (default).
FTR	CPND	Allow Call Party Name Display name assignment.

LD 11 – Define Class of Service Name Display Allowed on Meridian 1 proprietary sets.

Prompt	Response	Description
REQ:	NEW, CHG	Add, or Change.
TYPE:	xxxx	Telephone type, where: xxxx = SL1, 2006, 2008, 2009, 2016, 2018, 2112, 2216, 2317, 2616 or 3000.
CUST	xx	Customer number.
...		
CLS	CNDA	Call Party Name Display Allowed. Allows display of original DN name on redirection. (CNDD) = Call Party Name Display Denied (default).
CLS	DNDA	Dialed Name Display Allowed. This displays the originally dialed DN Name on redirected calls. (DNDD) = Dialed Name Display Denied.
CLS	NAMA	Name Display Allowed on the far end (default). (NAMD) = Name Display Denied.

LD 12 – Define Class of Service Name Display Allowed on Attendant Consoles.

Prompt	Response	Description
REQ	NEW, CHG	Add, or Change.
TYPE	xxxx	Console type where xxxx =1250 or 2250.
TN	c u	Terminal Number.

...		
CPND	CNDA	Call Party Name Display Allowed. (CNDD) = Call Party Name Display Denied (default).

LD 17 – Configure Remote Capability for QSIG D-channel.

Prompt	Response	Description
REQ	CHG	Change.
TYPE	ADAN	Action Device and Number.
- ADAN	aaa dch x	Change or New D-channel where aaa = NEW or CHG.
...		
- IFC	SL1	Interface type for D-channel.
...		
- RCAP	NDS	Allow Name Display Services (NDS) as new remote capability.

LD 17 – Configure Remote Capability for MCDN D-channel.

Prompt	Response	Description
REQ	CHG	Change.
TYPE	ADAN	Action Device and Number.
- ADAN	aaa dch x	Change Input/Output Device.
...		
- IFC	SL1	Interface type for D-channel.
...		
- RCAP	ND3	Allow Name Display 3 (ND3) as new remote capability.

LD 57 – Define the Calling Party Privacy Flexible Feature Code for Meridian 1 proprietary and Analog (500/2500 type) sets.

Prompt	Response	Description
REQ	NEW, CHG	Add, or Change.
TYPE	FFC	Flexible Feature Code data block.
CUST	xx	Customer number.
FFCT	YES	Flexible Feature Confirmation Tone.
...		
CPP	xxxx	Calling Party Privacy Flexible Feature Code (typically *67). CPP is only prompted if the CPP package is equipped.

Feature operation

To activate Calling/Connected Name Identification Restriction (CNIR) on a per call basis, the calling party dials the Calling Party Privacy (CPP) Flexible Feature Code prior to initiating the call.

ISDN QSIG Path Replacement

ISDN QSIG Path Replacement allows an active connection through an ISDN QSIG private network to be replaced with more efficient connection. Path replacement service is invoked by the following triggers:

- QSIG Call Diversion (QSIG Call Diversion redirects Call Forwarding Busy, Call Forwarding No Reply and Call Forwarding Unconditional calls to another set over a QSIG network)
- Network congestion on the first Private Integrated Service Network Exchange (PINX) node

Note: Private Integrated Service Network Exchange (PINX) may be used interchangeably with Private Branch Exchange (PBX).

- Detection that the connected number differs from the called number

QSIG Path Replacement does not directly attempt to reduce the number of trunks involved in a call. This feature attempts to replace non-optimum paths across a QSIG network with an optimum path. The optimum path between to PINX nodes is the path which takes the first choice route to all PINXs. The optimum path is not set up until the terminating set answer the call.

ISDN QSIG Path Replacement uses the following replacement mechanisms: triangulation and anti-tromboning. These are described in more detail beginning on page page 249.

QSIG Path Replacement is permanently active on the PINX. This service is triggered internally or externally by another PINX. QSIG Path Replacement can be invoked on a mixed network of QSIG and Non-QSIG (such as MCDN). Path replacement uses the PINX_DN in the Customer Data Block as a rerouting number. Only QSIG interfaces are optimized. The Meridian Defined Customer Network (MCDN) is not optimized.

The section that follows discusses the use of Private Integrated Service Network Exchange (PINX) DNs as part of the Path Replacement feature.

ISDN PINX DN

The Path Replacement feature must scan the PINX nodes to find the optimum path to a remote PINX node. To accomplish this trunk optimization function, Path Replacement makes non-call associated requests (D-Channel messages only, no B-Channels are used) to the Path Replacement feature at the remote PINX node. The requests are not directed to any existing DN on the remote PINX node, but to a processing function on that PINX node.

To be able to route those types of calls through the network from one originating node to a destination node, an ISDN PINX DN must be defined for each PINX node in the network.

The ISDN PINX DN is a DN taken from the customer's numbering plan used to aid with the routing of network calls. It does not correspond to a real terminal on the node, so it is never busy. The ISDN PINX DN uses the same number of digits as the numbering plan; either UDP or CDP. It is defined so that the Path Replacement feature on a distant node can make non-call associated calls to the Path Replacement feature on another node when no particular destination exists. Those calls are made using existing routing configurations, e.g. a CDP distant steering code or a UDP location code expecting a fixed number of digits. For example, the far end PINX node has a digit sequence composed of the steering code plus the ISDN PINX DN with the same length and digit sequence used to route normal calls from the distant node to the local node for CDP type calls and location code plus a 4 digit ISDN PINX DN for UDP type calls.

One ISDN PINX DN should be configured per network location. This ISDN PINX DN is used for the Path Replacement feature and other features such as Electronic Lock Network Wide/Electronic Lock for Private Lines and Call Pickup Network Wide features.

No user or feature other than Path Replacement, Electronic Lock Network Wide/Electronic Lock for Private Lines and Call Pickup Network Wide features will be allowed to dial the ISDN PINX DN. If a user dials this DN, they will receive overflow tone.

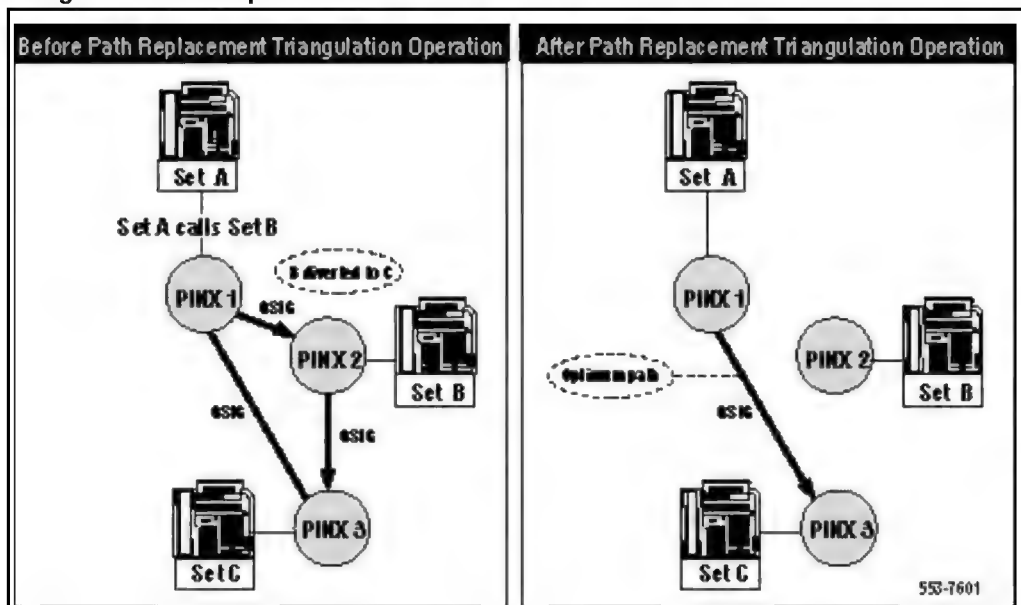
Triangulation Path Replacement

With Triangulation Path Replacement, either the originating or the terminating node involved in a QSIG call recognizes that a call is using a non-optimum path due to call diversion, network congestion or detection of a different number than dialed. If this call is still ringing, the originating/terminating node will wait for an answer signal before initiating triangulation path replacement. If the call is established, then replacement can be performed immediately.

The ISDN QSIG Path Replacement feature replaces non-optimum paths across a QSIG network with optimum paths. An optimum path between two nodes is the first choice route at all nodes. This feature does not attempt to reduce the number of trunks involved in a call but does attempt to locate the optimum path.

As shown in Figure 6, Set A on PINX 1 calls Set B on PINX 2. Set B has activated Call Forward All Calls to Set C on PINX 3. Trunk optimization occurs between PINX 1 and PINX 3. Trunks between PINX 1 and PINX 2 and PINX 2 and PINX 3 are torn down after the call is answered by Set C.

Figure 6
Triangulation Path Replacement



Anti -Tromboning Path Replacement

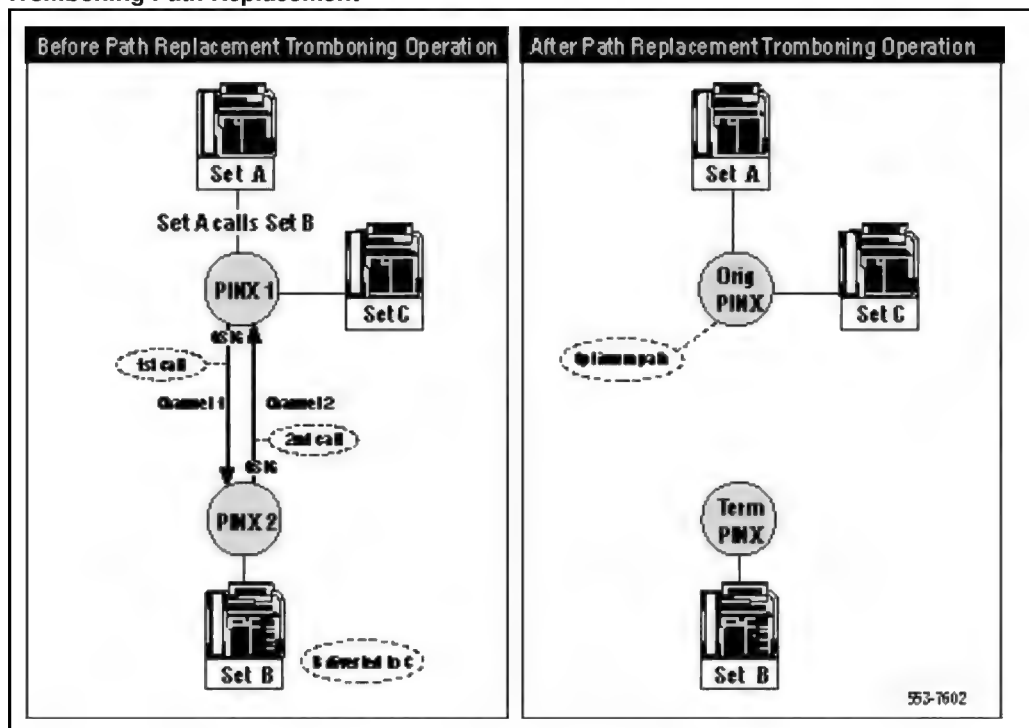
This feature performs anti-tromboning replacements to eliminate any dual parallel trunking that are caused by call modification.

Anti-tromboning path replacement is only invoked after the divert-to caller answer the call. Anti-tromboning is only performed when all the trunks are associated with the same customer.

As shown in **Figure 7**, Set A on PINX 1 calls Set B on PINX 2. Set B has activated Call Forward All Calls to Set C on PINX 1.

Anti-tromboning occurs between PINX 1 and PINX 2 and these trunks are torn down after Set C answers the call.

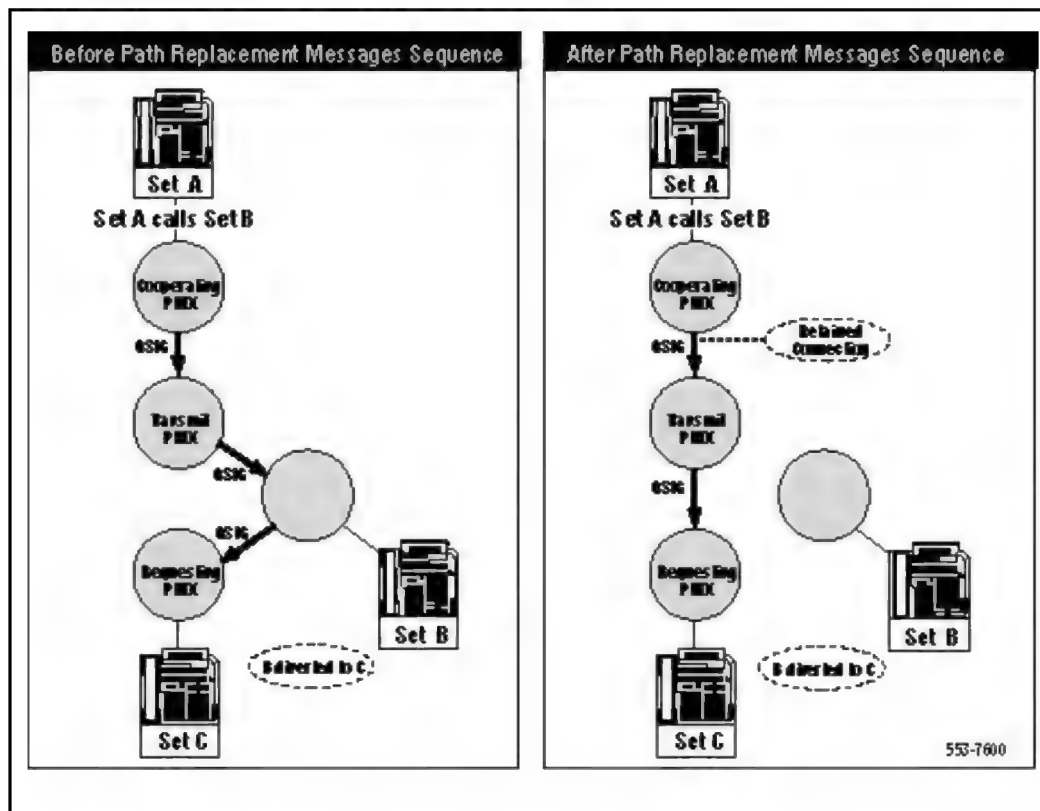
Figure 7
Tromboning Path Replacement



Retaining Path Replacement

When path replacement has been invoked, the cooperating PINX determines whether or not to retain part of the original connection provided that the original connection used the optimum route to reach the re-routed number. As shown in [Figure 8](#), the connection between the cooperating and transit PINX is retained after path replacement has occurred.

Figure 8
Path Replacement Retaining Part of Old Connection



Operating parameters

Network congestion occurs when a non-optimum path from the first PINX node is detected.

When call diversion is not supported by a PINX node, path replacement is triggered when the connected number differs from the called party's number.

ISDN QSIG Path Replacement requires the Multi-Serial Data Link (MSDL) card. This feature is only supported on Coordinated and Uniform Dialing Plans. Route Access Codes are not supported. Digit manipulation is not supported.

If a path replacement request is triggered and fails with the cause "invalid Rerouting Number" the request is discontinued. No attempt is made with another rerouting number.

When a call has several triggers for path replacement and the first trigger fails, no other attempts are performed using the other triggers. Path replacement triggers are chosen according to the following order:

- 1** QSIG Call Diversion
- 2** Congestion on the first PINX
- 3** Different Connected Number

The configuration of diversion and connected number triggers can generate a lot of path replacement collisions if the QSIG Call Diversion feature is configured on the QSIG network. In this situation, it is recommended that only the diversion trigger be configured. This establishes the optimized call in the same direction as the originating call.

New traffic reports are generated for QSIG Path Replacement. TSF009 reports traffic activity for D-channels and TFS011 reports traffic activity for Multi-purpose ISDN Signalling Processor (MISP) for QSIG Path Replacement service. This pertains to ISDN BRI trunk applications.

Feature interactions

Attendant Console

Path replacement calls invoked by an attendant are not supported.

Attendant Barge In

Attendant Break In

The Attendant Barge In and Attendant Break In features are not supported during path replacement operation.

Automatic Call Distribution

ISDN QSIG Path Replacement calls placed in an Automatic Call Distribution (ACD) queue are initially rejected. Path replacements requests are accepted after the call is answered by an ACD agent.

Call Transfer

When a local is transferred by the Meridian 1 during an ISDN QSIG Path Replacement request, then the replacement request is terminated. After Call Transfer, the Meridian 1 may accept path replacement from another PINX. QSIG Call Transfer is not supported at this time.

Call Hold

Path Replacement cannot be invoked on a held call. Path replacement is only accepted on an active call.

Conference Calls

The Meridian 1 does not invoke path replacement when callers are involved in an established conference. Any replacement requests from a far end PINX are rejected when a call is on an established conference.

Customer Controlled Routing

Following a Customer Controlled rerouting, path replacement is only invoked by the connected number trigger.

Direct Inward System Access

Path replacement does not occur on a Direct Inward System Access (DISA) call. The Meridian 1 does not invoke the Path Replacement feature on DISA calls.

Music**Radio Paging****Recorded Announcement**

The Meridian 1 does not invoke the Path Replacement feature on Music, Paged or Recorded Announcement calls.

Feature packaging

The following packages are required for ISDN QSIG Path Replacement:

- QSIG Supplementary Services (QSIG-SS) package 316
- QSIG-GF Transport (QSIGGF) package 305
- QSIG Interface (QSIG) package 263
- Network Alternate Route Selection (NARS) package 58 (for Uniform Dialing Plan), or Coordinated Dialing Plan (CDP) package 59

On a 1.5 Mbps PRI interface the following packages are required:

- Integrated Services Digital Network (ISDN) package 145
- ISDN Primary Rate Access (PRA) Central Office package 146
- Multipurpose Serial Data Link (MSDL) package 222

Feature implementation

LD 15 – Configure Private Integrated Services Network Exchange Directory Number.

Prompt	Response	Description
REQ:	CHG	Change existing data.
TYPE:	NET	Networking.
CUST	xx	Customer number.
...		
ISDN	YES	Integrated Services Digital Network.

...		
- PINX_DN	xx...x	Private Integrated Services Network Exchange Directory Number, up to seven digits.

LD 16 – Configure New Path Replacement parameters for a QSIG ISGF interface.

Prompt	Response	Description
REQ	CHG NEW	Change existing data. Add new data.
TYPE	RDB	Route Data Block.
CUST	xx	Customer number.
ROUT	0 - 511 0-127	Route Number. For Option 11C.
...		
DTRK	YES	Digital Trunk Type.
- DGTP	PRI	PRI trunk.
- IFC	ISGF	QSIG Interface ID for ISO with GF capability.
...		
RCAP		Add Path Replacement as a remote capability.
	PRI PRO	PRI = The encoding method uses Integer values. PRO = The encoding method uses Object Identifier.
		PRI and PRO are mutually exclusive, and cannot be configured together at the same time on the same link.
		Precede PRI and PRO with X to remove. The previously configured PR parameters will be valid, if PR is deactivated and then reactivated.
...		

PR_TRIGS	<CR> DIV xx-y CNG xx-y CON xx-y	Path Replacement Triggers. <CR> = If REQ = NEW, the parameters are set to the default values, which are: DIV 2 3 (two PR attempts, with a three minute delay for Diversion triggers) CNG 2 3 (two PR attempts, with a three minute delay for Congestion triggers) XCON (Connected Number is not a trigger). If REQ = CHG, the Path Replacement parameters are not modified. DIV = Diversion is used to trigger Path Replacement. CNG = Congestion is used to trigger Path Replacement. A Connected number different from a called number is used to trigger Path Replacement. where: xx = 0-(2)-15, the number of Path Replacement attempts (the default is two). If 0 is entered, the number will be set to infinite. yy = 1-(3)-7, the delay, in minutes, between two consecutive Path Replacement attempts (the default is three minutes). Precede DIV, CNG, and CON with X to remove the Path Replacement trigger.
PR_RTN	YES (NO)	Retain option is (is not) supported by the far end PINX.
...		

LD 17 – Configure QSIG Path Replacement for a QSIG ISGF interface.

Prompt	Response	Description
REQ	CHG	Change existing data.
TYPE	CFN	Configuration Record.
ADAN	CHG DCH X	Change D-Channel number.
...		
- IFC	ISGF	QSIG Interface ID for ISO with GF capability.
...		
- RCAP	aaa	Add Path Replacement as remote capability where: PRI = Integer values as encoding method. PRO = Object identifier as encoding method. Precede with X to remove.
...		
PR_TRIGS	<CR>	Path Replacement Triggers. <CR> = If REQ = NEW, the parameters are set to the default values, which are: DIV 2 3 (two PR attempts, with a three minute delay for Diversion triggers) CNG 2 3 (two PR attempts, with a three minute delay for Congestion triggers) XCON (Connected Number is not a trigger). If REQ = CHG, the Path Replacement parameters are not modified.
	DIV xx-y CNG xx-y CON xx-y	DIV = Diversion is used to trigger Path Replacement. CNG = Congestion is used to trigger Path Replacement. CON = A Connected number different from a called number is used to trigger Path Replacement. where: xx = 0-(2)-15, the number of Path Replacement attempts (the default is two). If 0 is entered, the number will be set to infinite. yy = 1-(3)-7, the delay, in minutes, between two consecutive Path Replacement attempts (the default is three minutes).

PR_RTN	YES (NO)	Retain option is (is not) supported by the far end PINX.
--------	----------	--

Feature operation

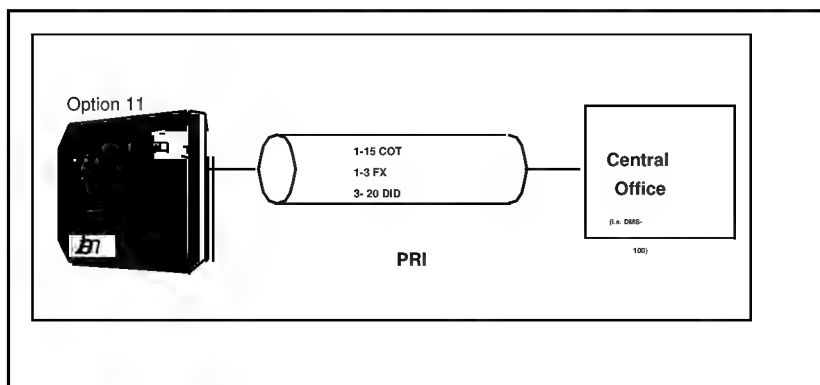
No specific operating procedures are required to use this feature.

Integrated Service Access (ISA)

By using various call set-up messages, the Meridian 1/SL-1 can designate to the network which service is desired on a call-by-call basis. Similarly, the network can indicate to a Meridian 1/SL-1 on a call-by-call basis, the service for the incoming call. The selection of a B-channel is on a call-by-call basis as specified by the call type, which specify the attributes of the call.

ISA eliminates the need for dedicated 'B' channels for each service. Rather than having a fixed number of CO, WATS, or FX trunks, trunks are shared for the various services. Dedicated 'B' channels, however, could be provided if the customer requires them.

ISA allows a flexible connection to the Central Office that offers more efficient trunk utilization based on the calling patterns of the customer. Channels are utilized on a Call by Call basis as determined by the minimum and maximum numbers specified on the Meridian 1/SL-1.



X11 release 18 (and later)

In X11 release 18, ISA is enhanced to provide the following:

- Private, INWATS, FX and TIE call types received from an ISA master route terminate to an individual set with or without Incoming Digit Conversion (IDC) for the DMS and AT&T interfaces.
- ISA service routes allow an auto-terminate DN to be defined in the route data block. Calls can terminate to an ACD queue using Dialed Number Identification Services (DNIS) for the DMS and AT&T interfaces.
- Private call type is supported for the DMS interface on a per route basis. (Specify Private in LD16.)
- Service Identifier (SID) is supported with INWATS call types for the DMS interface.
- The Service Identifier (SID) value no longer defaults to route number. A unique value must be specified by the user.
- When printing the route data block for an ISA master route, all the associated service routes are printed after the new prompt, SVRT, in LD 21. The following figure shows how SVRT in LD 21 prints the ISA service routes configured in LD 16.

LD16

<u>Prompt</u>	<u>Response</u>
ROUT	50
TKTP	TIE
ISAR	YES
RTN	60

LD16

<u>Prompt</u>	<u>Response</u>
ROUT	51
TKTP	WAT
ISAR	YES
RTN	60

LD16

<u>Prompt</u>	<u>Response</u>
ROUT	52
TKTP	COT
ISAR	YES
RTN	60

LD21

<u>Prompt</u>	<u>Response</u>
ROUT	60
TKTP	ISA
SVRT	50
	51
	52

Note : The prompt SVRT does not appear in LD16. When the route is configured in LD16, this information is added automatically to the ISA master route.

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Characteristics of the X11 release 18 ISA enhancements are detailed below:

- The range of the Service Identifier (SID) for the Meridian 1 to DMS interface is from 0 to 511. Each SID received in the ISA trunks uniquely corresponds to a service route defined in LD16. Also, each service route uniquely corresponds to a SID in the DMS machine type.
- The range of the Service Parameter for the Meridian 1 to ESS interfaces is from 0 to 9 for the parameterized WATS band service. WATR and COTR depend on the operation of service routes.

- For Meridian 1 to DMS interfaces, if there is no Network Specific Facility Information Element (NSF) (IE) received in the ISA master route, Meridian 1 treats the call using the service route configuration defined for the COTR prompt in LD16. If the trunk type of the COTR is COT, all the calls terminate to the Meridian 1 attendant. If the trunk type of the COTR is DID, each call terminates to its DID number. Similarly, if the trunk type of the WATR is WAT, all the calls terminate to the Meridian 1 attendant. If the trunk type of the WATR is DID, each call terminates to its DID number.
- For the Meridian 1 to ESS interfaces, if there is no NSF IE received in the ISA master route, Meridian 1 treats the call using the ISA service route configuration which is defined as the ACCUNET service for the SRVC prompt in LD16. If the trunk type of the ISA service route is Direct Inward Dialing (DID), each call terminates to its DID number.
- If an INWATS call or Public call received in the ISA master route is intended to be terminated to the Meridian 1 attendant, either IDC can be used to convert the incoming called number of the attendant DN, or the incoming called number must match the Listed Directory Number (LDN) in the Customer data block. You can also terminate one service route per ISA route by programming the service route number at the COTR and WATR prompts.
- For the Meridian 1 to DMS interfaces, the minimum and maximum counter (Min/Max) function is on a per service route basis. For example, route 40 (call type of OUTWATS with SID 9) or route 45 (call type of OUTWATS with SID 13), can each reserve its own minimum B-channels and limit its maximum B-channels to be used in the ISA pools.

- Since AT&T is limited to one service type per service route in a given ISA master route, for the Meridian 1 to ESS interfaces, the Min/Max counter function is on a per service route basis. That is, AT&T supports only one Min/Max function for the service types in a given ISA master route, not a Min/Max per band. Configure only one set of the minimum and the maximum B-channels in LD16 for all the bands of the WATB service.
- For AT&T interfaces, only 9 possible services may be used per ISA master route. With Northern Telecom DMS products, there are 512 possibilities, one for each SID value.

Package Requirements

Package requirements are as follows:

ISDN	option 145
PRI	option 146
NARS or CDP	option 58 (NARS) or option 59 (CDP)
CBC (DCA)	Option 117
NTWK	option 148 (for Centrex connectivity)
Note 1: Package 149, IEC, is required for Inter-exchange carrier, that is DMS-250 and AT&T 4ESS. Note 2: If Incoming Digit Conversion (IDC) is required (see Feature implementation), then Package 110, IDC for DID, is necessary. It is dependent on Package 49, New Flexible Code Restriction. Note 3: If Dialed Number Identification Services (DNIS) is required (see Feature implementation), then Package 98, DNIS, is required.	

Integrated Trunk Access (ITA)

Integrated Trunk Access is a Meridian 1 capability allowing a T-1 facility to include both ISDN out-of-band signaling trunks as well as 'A' and 'B' bit signaling trunks. This capability has applications with ISDN private line service, multiplexers and digital cross-connects.

Package Requirements

This feature requires the following options:

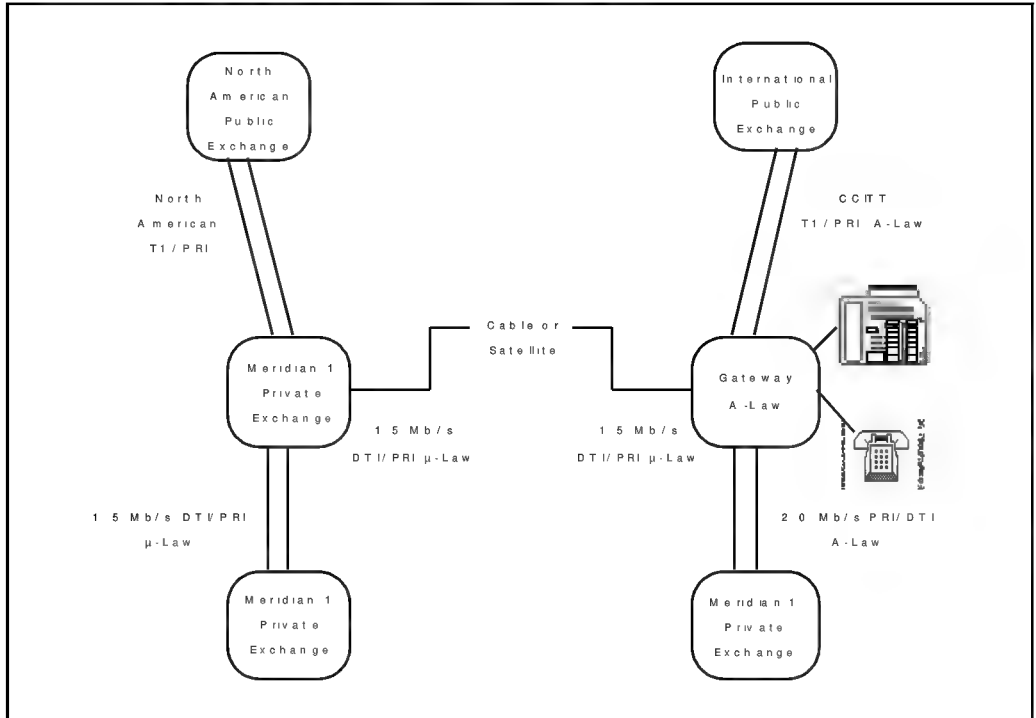
ISDN	option 145
DTI	option 75
PRI	option 146

ISDN – International 1.5/2 Mb/s Gateway

This feature provides digital gateways between North American and International Telegraph and Telephone Consultative Committee (CCITT) standards. The international gateway functions as a network node by providing A-Law/ μ -Law conversion and loss of level adjustments to underwork between 1.5 Mb/s and 2 Mb/s Primary Rate Interface/Digital Trunk Interface.

The figure that follows depicts the standard configuration of an X11 International 1.5/2 Mb/s gateway. The gateway switch can function either as an a-Law or μ -Law switch.

Figure 10
International 1.5/2 Mb/s ISDN Gateway Configuration



This feature makes the following software, firmware, and hardware provisions:

A-Law/μ-Law conversion

The following software, firmware, and hardware modifications have been made to accommodate A-Law/μ-Law conversion for the International 1.5/2 Mb/s gateway:

- A-Law/μ-Law conversion has been provided in the QPC720 card.
- Firmware modifications have been made to the PROM/look-up table.
- The Meridian 1 software has been modified to send an SSD message to the hardware on a per-call basis.

The QPC472 DTI card should not be used in gateway configuration because it does not support A-Law/ μ -Law conversion.

Clock Synchronization

The international gateway switch uses the stratum 4 QPC775 clock controller card synchronized to an international Public Exchange. The North American side of the gateway also uses a stratum 3 QPC775 clock controller card synchronized to a high-quality clock on the North American Public Exchange.

Loss of Level Adjustments

The following software, firmware, and hardware modifications have been made to accommodate Loss of Level Adjustments for the International 1.5/2 Mb/s gateway:

- Since each country has its own loss-level plan, 14 new pad values have been introduced on the QPC720 card. These values are +0.6db, +7db, +9db, +10db, +11db, +12db, +13db, +14db, -4db, -5db, -7db, -8db, -9db, and -10db.
- In order to implement the new pad values, the pad PROM/look-up table has been modified.
- The Meridian 1 software has been changed to send an SSD message to set the new pad values in the QPC720 card. Also, a new SSD message, to account for all possible pad pairs, has been created.
- The number of pad values supported on the PRI2 has been expanded. The following 11 new pad values have been introduced: +7db, +9db, +11db, +13db, +14db, -4db, -5db, -7db, -8db, -9db, and -10db.

These values are not supported on 2 Mb/s Digital Trunk Interface.

Feature interactions

The following Integrated Services Digital Network (ISDN) features will function transparently across the International Gateway if the dialing plans are consistent on either side of the gateway:

- Calling Line Identification

- Network Call Redirection
- Network Call Party Name Display
- Network Ring Again
- 64 kbps Clear Data
- Overlap Signaling
- International PRA (30b+d) and DTI2
- Meridian MS-1 Audio Teleconferencing
- ISDN Call Connection Limitations
- International Private Exchange to Public Exchange Primary Rate Interface (PRI) Connectivity (SYS-12, AXE-10, 1TR6, and E10)

Only those features supported by these connections will function transparently across the gateway.

The following features are not supported by the International Gateway:

- 64 kbps Restricted Data
- 56 kbps Clear Data
- Virtual Network Services

Feature packaging

The International 1.5/2 Mb/s Gateway (GPRI) feature is available in package 167.

Package Requirements

This feature requires the following options:

PBXI	option 75
ISDN	option 145
PRA	option 146
PRA2	option 154

ISDN Networking: Advanced Network Services

This package allows for the activation of Network Ring Again, Network Call Redirection and Trunk Optimization.

Package Requirements — NTWK with NARS and PRI

Package requirements are as follows:

NARS	option 58
PBXI	option 75
ISDN	option 145
PRI	Option 117

Package Requirements — NTWK with NARS and ISL

Package requirements are as follows:

NARS	option 58
ISDN	option 145
ISL	option 147

Package Requirements — NTWK with CDP and PRI

Package requirements are as follows:

CDP	option 59
PBXI	option 75
ISDN	option 145
PRI	Option 117

Package Requirements — NTWK with NARS and ISL

Package requirements are as follows:

CDP	option 59
ISDN	option 145
ISL	option 147

Package Requirements — NARS and CDP

All PRI applications require Digital Trunk Interface PBXI option 75. ISL applications do not require option 75 unless used in conjunction with DTI.

NSIG (option 37) is required for TCOS and ESN Signaling.

ISDN Signaling Link (ISL)

This feature allows a user with analog or digital tie trunks to replace in-band signaling with out-of-band D-Channel signaling. TIE trunk types (including DTI) are supported on Meridian 1/SL-1 to Meridian 1/SL-1 connections only.

The ISDN link provides ISDN Feature Networking Services to locations where a DTI/PRI link (T1 span) is not available or not economically justified.

ISL uses a dedicated channel at speeds between 24 and 64 Kbps to establish the ISDN D-Channel for transmission of the ISDN Q.931 signaling protocol. The D-Channel link is established to the far end using one of the following types of facilities:

- 24th channel on a PRI in the case of ISL shared mode (same as PRI)
- a pair of modems or Meridian 1 Data Modules in the case of ISL dedicated mode

The associated voice or data is sent through the existing conventional analog or digital trunks.

Note: In the case of D-channel failure, signaling will revert back to conventional in-band signaling. This Auto recovery feature is available in Meridian 1/SL-1 systems.

Package Requirements

ISDN signaling Link requires the following:

ISDN	option 145 and ISL option 147
------	-------------------------------

Note: DTI (pkg 75) software or the NTAK09 DTI/PRI circuit card is not required to implement ISL unless a T1 facility is used.

ISDN Signaling Package

This package is the base platform required by all other ISDN packages. It provides the CCITT Q.931 layer 3 signaling, for support of ESN/ISDN features.

Manual Trunk Service

This service is not supported over ISDN facilities.

Meridian 1 PRI to DMS-100

Connection to a Central Office equipped with a DMS-100 can be accomplished using three methods:

- 1 Dedicated channels:** similar to Digital Trunking-DTI, but with Calling Line Identification (CLID), speed of call setup and out-of-band signaling.
- 2 Call by Call (ISA):** service selection without maximum or minimum settings for each trunk type. This arrangement would ultimately provide blockage to some routes.
- 3 Call by Call (ISA):** service selection with maximum and minimum settings for each trunk type. This may also be referred to as dynamically allocating trunk types on a call by call basis.

Note that a combination of options is also possible, i.e. dynamically allocating some channels, while providing a number of dedicated channels per customer's request all on the same link.

Availability

The availability of the above options depends on local service offerings.

Software implementation and feature activation coordination between the Central Office and Meridian 1 PBX personnel is very critical and must be achieved during initial installation and on an ongoing basis.

Considerations

Configuration of this link requires consideration of software constraints in its initial implementation. Some of these considerations are listed below:

- Only one incoming WATS route at any time can be configured on this link. Work-arounds are possible using TIE routes and must be arranged with the central office. This constraint applies to methods 2 and 3 above.
- Only one incoming COT or incoming DID route can be configured. The link can only support DID or DOD but not both. Again, work-arounds are possible using TIE route and must be arranged with the central office. This constraint applies to methods 2 and 3 above.

A Meridian 1 PRI to a DMS-100 interconnection requires a Uniform (UDP) or Coordinated (CDP) Dialing Plan plus ISDN if you are in a private network environment.

Package Requirements

This feature requires the following options:

ISDN	option 145
PRI	option 146
NARS	option 58
CBC (DCA)	Option 117
NTWK	option 148 (for Centrex connectivity)

Note: In the above chart, CBC is Call by Call without maximum or minimum settings (Method 2). DCA is Dynamic Channel Assignment (Method 3).

Meridian Mail Trunk Access Restriction

The Meridian Mail Trunk Access Restriction (MTAR) feature prevents direct or indirect call transfer or conference of external calls to Meridian Mail. In this feature, external calls are defined as incoming/outgoing trunk calls that originate or terminate outside a private network.

This definition is applicable to all types of trunks, with the exception of TIE trunk calls. External calls are separated from a transferring/conferencing set on a network using TIE trunks. MTAR operation is dependant on the information sent to the remote node from the node that is attempting to transfer/conference. MTAR is triggered if the network information (such as Network Attendant Service or Calling Line Identification) indicates that an external call and a transfer/conference attempt to Meridian Mail is occurring. MTAR is also triggered if local information, such as Route Class, indicates an external call and a transfer/conference attempt to Meridian Mail is occurring.

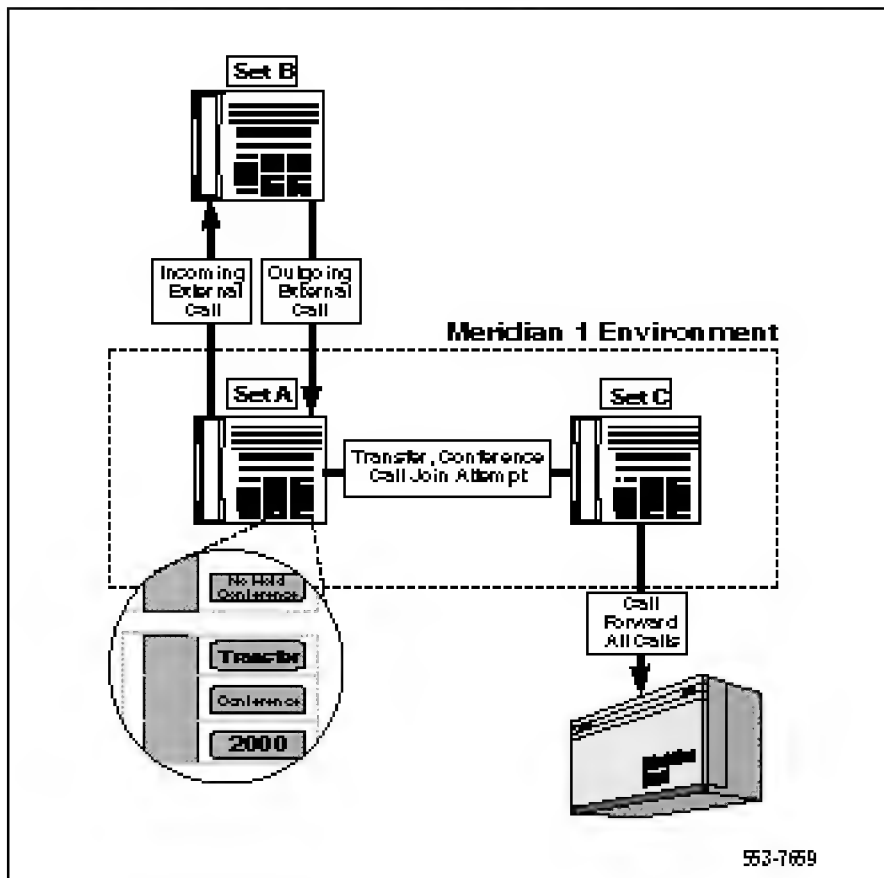
Meridian Mail Trunk Access Restriction averts potential Meridian Mail system abuse by distinguishing between internal and external calls that are directed to Meridian Mail. When activated, Meridian Mail Trunk Access Restriction impacts the operation of the following features:

- Call Transfer
- Conference,
- No Hold Conference, and
- Call Join capabilities of the Multi-Party Operation feature.

Meridian Mail Trunk Access Restriction prevents the completion of any Call Transfer, Conference, No Hold Conference or Call Join attempts on incoming/outgoing external calls to Meridian Mail.

As illustrated in **Figure 11**, Maters capabilities prevent an established call between Set A, an internal call, and Set B, an external call, from being forwarded to Meridian Mail. When Set A attempts to either Transfer, Conference, No Hold Conference or Call Join Set B to Set C, which is either a direct Meridian Mail DN or has activated Call Forward All Calls (CFAC) to Meridian Mail, the transfer and conference keys are ignored when pressed to complete operation.

Figure 11
Meridian Mail Trunk Access Restriction Call Transfer



Operating parameters

MTAR does not treat Centralized Attendant Position and Night Attendant sets as Attendant Consoles. These sets receive treatment based on their actual set type. For example, if the night attendant is a Meridian 1 proprietary set, then it is treated as Meridian 1 proprietary set.

The operation of an Attendant Console is not affected when this feature is enabled. An attendant can transfer or conference an external line to Meridian Mail directly or indirectly.

MTAR does not affect Automatic Attendant, Customer Controller Routing, Integrated Voice Response or Meridian Link features. However, if a user disallows any of these features from accessing Meridian Mail, the application must be written to take this into account.

Call transfer from ISDN Basic Rate Interface (BRI) set is not supported.

In a networking environment, Meridian Mail must reside on the same node as the transferring/conferencing set.

Feature interactions

Traffic Reporting

Traffic Reporting and Meridian Administration Tool's (MAT) traffic report, TFC005, are modified to report the number of times this feature is requested. A new line is added for the Meridian Mail Trunk Access Restriction which is identified by the feature number "27" and its peg count.

Network Call Transfer

Network Call Conference

Meridian Mail Trunk Access Restriction (MTAR) requires the transferring or conferencing set and Meridian Mail to be located on the same node. If the transferring or conferencing set are located not on the same node as Meridian Mail, the MTAR feature is not provoked because the call transfer/ conference attempt is terminated by a network on Meridian Mail.

However, an external call can be transferred or conferenced over the network, using TIE trunks. This operation is dependant on the type of network information the remote node forwards to the node where the transfer/conference attempt is made. Meridian Mail must be on the transferring/conferencing node. If network information is provided, indicating that an external call is attempting to transfer/ conference to Meridian Mail, the MTAR feature is invoked. When no network information is provided, MTAR is provoked if the local information (Route Class) indicates that an external call to Meridian Mail is being attempted.

Feature packaging

Meridian Mail Trunk Access Restriction requires Message Waiting Center (MWC) package 46.

Feature implementation

Meridian Mail Trunk Access Restriction feature requires prior installation of Meridian Mail. The implementation of this feature, therefore, assumes that Meridian Mail has been properly configured.

LD 15 – Enable Meridian Mail Trunk Access Restriction.

Prompt	Response	Description
REQ:	CHG	Change.
TYPE:	FTR	Customer Features and Options.
CUST	0-31	Customer number.
- OPT	MCI	Message Centre Included.
...		
- MTAR	YES	Meridian Mail Trunk Access restricted. NO = Meridian Mail Trunk Access allowed.

Feature operation

Call Transfer/Conference

Meridian 1 Proprietary Set

Set A is a Meridian 1 proprietary set with Transfer Key and Conference Key.

- 1 An incoming/outgoing external call is established between Set A and Set B, an external party. The call between Set A and Set B is active on Key X.
- 2 Set A presses the Transfer/Conference Key that automatically puts Set B on Hold.
- 3 Set A dials Set C. Set C has either Call Forward All Calls to Meridian Mail or is a Meridian Mail DN.
- 4 When Set A attempts to transfer/conference Set B by pressing more than once the Transfer/Conference Key it is ignored.
- 5 Set A recovers Set B by pressing Key X.

No Hold Conference

Meridian 1 Proprietary Set/ISDN BRI Set

When Meridian Mail Trunk Access Restriction is enabled, direct or indirect no hold conference to an external call is permitted. During direct or indirect no hold conference, the calling party is never put on hold.

Set A is a Meridian 1 proprietary set or an ISDN BRI set with a No Hold Conference Key configured as either No Hold Conference, Conference Autodial, Conference Speed or Conference Hotline.

- 1 An incoming/outgoing external call is established between Set A and Set B, an external party. The call between Set A and Set B is active on Key X.
- 2 Set A presses the No Hold Conference Key.
- 3 Set A dials Set C. Set C is has either Call Forward All Calls to Meridian Mail enabled or is a Meridian Mail DN.

- 4 The conference is set up as normal. However a two party connection between Set B, an external party, and Meridian Mail is not allowed if the call controller releases. If this occurs, the connection between the trunk and Meridian Mail party is dropped.

Transfer***Analog (500/2500 type) Set***

Set A is an Analog (500/2500 type) set with a XFA Class of Service (transfer and three/six party conference allowed).

- 1 An incoming or outgoing external call is established between Set A and Set B, an external party.
- 2 Set A performs a switchhook flash that puts Set B on hold.
- 3 Set A dials Set C. Set C has either Call Forward All Calls to Meridian Mail enabled or is a Meridian Mail DN.
- 4 Before or after the Meridian Mail has answered, Set A attempts to transfer Set B to Meridian Mail by going on-hook.
- 5 This attempt is treated as an illegal transfer. Set A is re-rung and reconnected with Set B when going off-hook.

Conference***Analog (500/2500 type) Set***

Set A is an Analog (500/2500 type) set with a XFA Class of Service (transfer and three/six party conference allowed).

- 1 An incoming or outgoing external call is established between Set A and Set B, an external party.
- 2 Set A performs a switch hook flash that puts Set B on hold.
- 3 Set A dials Set C. Set C has either Call Forward All Calls to Meridian Mail enabled or is a Meridian Mail DN.
- 4 Before or after the Meridian Mail has answered, Set A attempts to conference Set B to Meridian Mail by performing another switchhook flash.
- 5 The conference is not permitted. Set A is reconnected to Set B. The call to Meridian Mail is disconnected.

Set A is an Analog (500/2500 type) set with a TSA Class of Service (three party service allowed).

- 1 An incoming or outgoing external call is established between Set A and Set B, an external party.
- 2 Set A perform a switch hook flash that puts Set B on hold.
- 3 Set A dials Set C. Set C has either Call Forward All Calls to Meridian Mail enabled or is a Meridian Mail DN.
- 4 Before or after Meridian Mail has answered, Set A attempts to conference Set B to Meridian Mail by dialing the conference control digits.
- 5 The conference is not permitted and Set A is reconnected to Set B. The call to Meridian Mail is disconnected.

Table 17 summarizes how different external calls are handled when Meridian Mail Trunk Access Restriction is enabled.

Table 17
Summary of Meridian Mail Trunk Access Restrictions

Telephone	External Call Type	Operation	Failure Treatment	Result
500/2500	Incoming	Transfer to Meridian Mail (MMail)	Re-ring to transferring set	Not allowed
500/2500	Incoming	Transfer to set with Call Forward All Calls (CFAC) to MMail	Re-ring to transferring set	Not allowed
500/2500	Outgoing	Transfer to MMail	Disconnect external call and Meridian Mail	Not allowed
500/2500	Outgoing	Conference to set with CFAC to MMail	Disconnect external call and Meridian Mail	Not allowed
500/2500	Outgoing/ Incoming	Conference to MMail	Reconnect to external call. Disconnect call to MMail	Not allowed

500/2500	Outgoing/ Incoming	Conference to set with CFAC to MMail	Reconnect to external call. Disconnect call to MMail	Not allowed
Meridian 1 Proprietary	Outgoing/ Incoming	Transfer/Conference to MMail	Operation ignored	Not allowed
Meridian 1 Proprietary	Outgoing/ Incoming	Transfer/Conference to set with CFAC to MMail	Operation ignored	Not allowed
Meridian 1 Proprietary	Outgoing/ Incoming	No Hold Conference to Meridian Mail or to set CFAC to MMail	Not applicable	Allow
Meridian 1 Proprietary	Outgoing/ Incoming	No Hold Conference release to make MMail to trunk two-party connection	Disconnect MMail and external trunk	Not allowed
Meridian 1 Proprietary	Outgoing/ Incoming	Call Join of external call to MMail	Operation ignored	Not allowed
Basic Rate Interface	Outgoing/ Incoming	Conference to MMail	Operation ignored	Not allowed
Basic Rate Interface	Outgoing/ Incoming	Conference to set with CFAC to MMail	Operation ignored	Not allowed
Attendant	Outgoing/ Incoming	Transfer/Conference to Meridian Mail	Not Applicable	Allowed
Attendant	Outgoing/ Incoming	Transfer/Conference to set with Call Forward All Calls to Meridian Mail	Not Applicable	Allowed

Message Waiting Indication (MWI)

Message Waiting Indication (MWI) Interworking provides a means to pass the Message Waiting Indicator across a private network with the following types of systems: Meridian 1 Option 11, DMS-100, DMS-250, SL-100. This feature is compatible with Meridian 1 Network Message Services.

Note: Throughout this discussion, the phrase “other system” refers to the DMS-100, DMS-250, or SL-100.

MWI Interworking enables Meridian 1 users to subscribe to a the voice message system on the other system, or users on the other system to subscribe to the voice message system on Meridian 1.

With this feature, a single message system can serve a combined network, with either of two configurations:

- Meridian 1 Option 11 hosts the Message Center, and serves both Meridian 1 users and users of the other system in the same enterprise group.

Figure 12
Private Corporate Network with Meridian 1 Option 11 hosting the Message Center

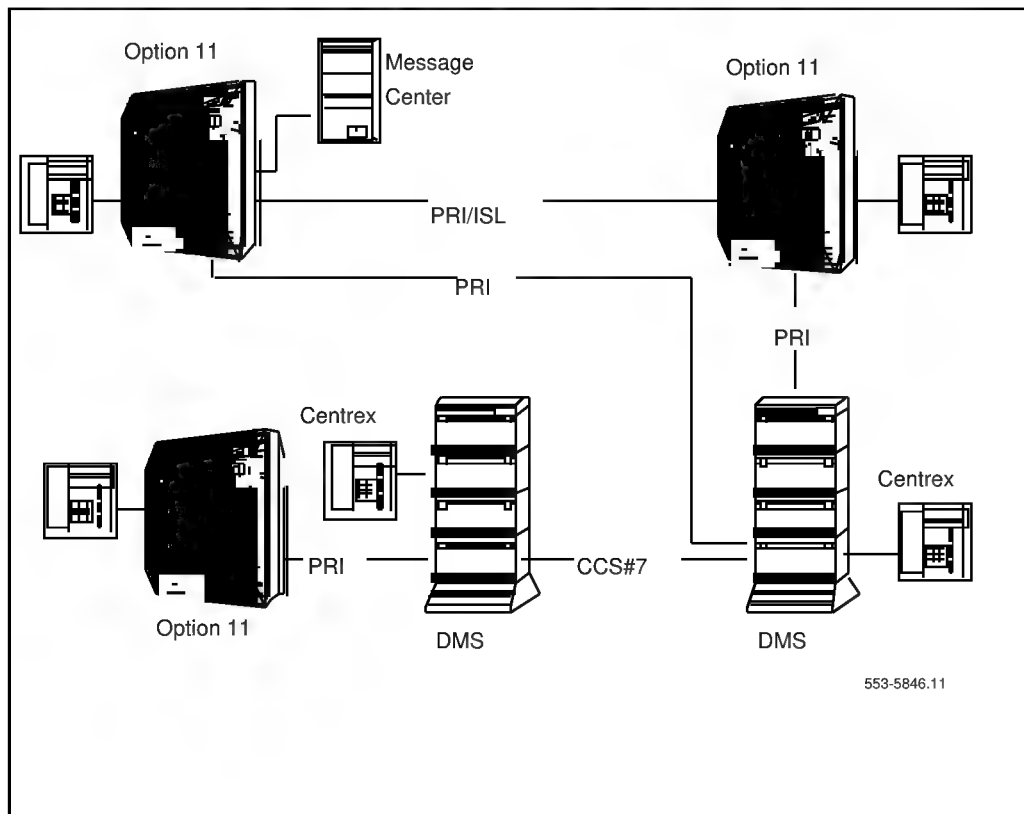
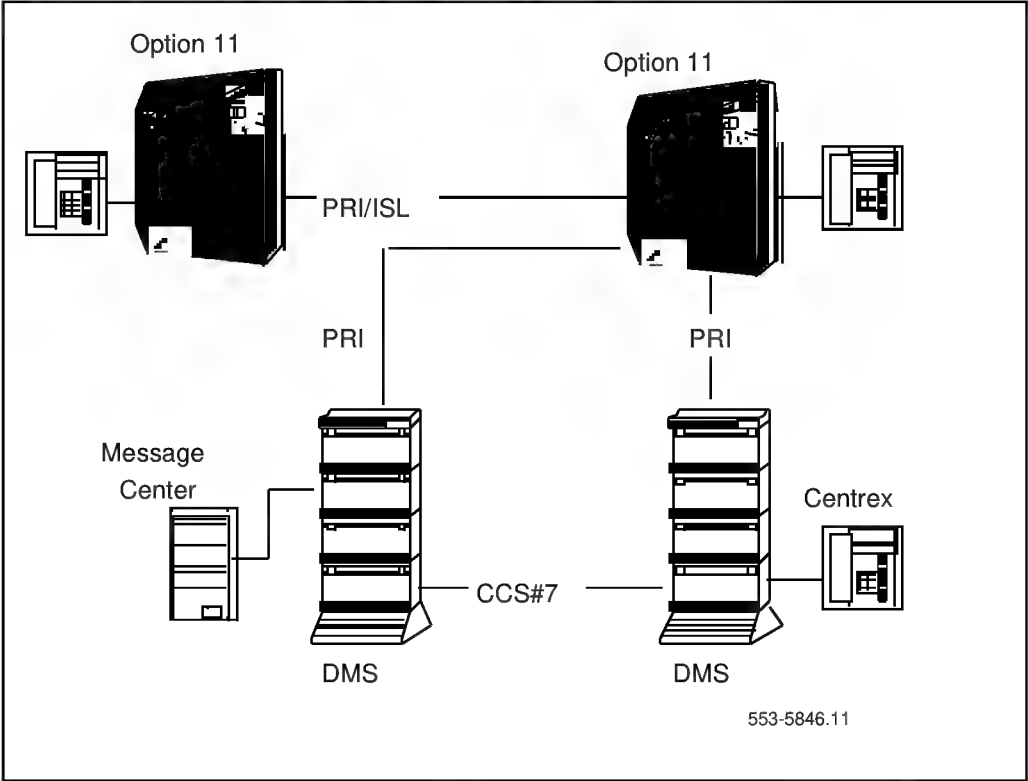


Figure 13
Private Corporate Network with DMS hosting the Message Center



Operating parameters

The switches in the network are connected as shown the Table below.

Network switch connections

To connect	Use
Meridian 1 to Meridian 1	ISDN/PRI/ISL
Meridian 1 to other system	PRI
Other system to other system	PRI/CCS#7

If the Message Center is on a Meridian-1 and it serves users on DMS, the Meridian-1 must be on X11 release 19 or later.

If the Message Center is on DMS for MWI Interworking, a Meridian-1 that is connected to DMS must be on X11 release 19 or later.

End-to-End Signalling is required to access the Message Center features from a local or remote system.

Only Meridian Mail is supported for use as the Message Center on a Meridian 1. This feature does not support any other messaging system, such as a manual Message Center hosted on a Meridian 1, a non-Meridian product hosting the Message Center, or other server applications (such as FAX servers or E-Mail).

The other system can be a tandem switch. DMS BCS 36 or later supports DMS-100, DMS-250, and SL-100 systems. Only Northern Telecom systems are supported.

Feature interactions

- **Multi Customer MWI**
Interworking does not support multiple customers because Meridian Mail supports only one customer. If multiple customers are required, multiple Meridian Mail servers are required.
- **Multi Tenant**
Meridian Mail Phase 8 and later supports Multi Tenant. For MWI Interworking, tenants that belong to the same customer can use one or multiple Message Center servers. Tenants from different customers cannot use the same Meridian Mail. The customer can allow (or disallow) access to this feature for specific tenants by configuring (or not configuring) the tenant's sets for call forwarding to Meridian Mail DN.
- **Trunk Optimization Before Answer**
There is no Trunk Optimization when the call is redirected to DMS, or answered by Meridian Mail. This applies to applications such as Auto Attendant.

- Network Message Services–Meridian Mail
The Facility message for MWI Interworking uses a different Transaction Capabilities Application Part (TCAP) format from that used for other network message services. Message conversion occurs when sending and receiving MWI Facility messages with software earlier than X11 release 19.
- DCH Error Monitoring
X11 release 17 DCH Error Monitoring monitors ISDN messages on a per feature basis. The conflict between the Service Identifier used by Meridian 1 and DMS for Network Message Services is resolved by providing a different Service Identifier (H70). X11 release 19 supports both the existing (H7C) and new Service Identifiers.

However, if the MWI RCAP for the D channel is added or deleted in Overlay 17, the D channel message monitoring must be disabled and enabled so that DCH Error Monitoring will work properly for the Network Message Services (NMS) feature.

- ISDN/AP Link Recovery
Calls in the Meridian Mail ACD queue are redirected to the ACD Night Call Forward DN when the Application Modular Link (AML) goes down.

Feature packaging

MWI Interworking is available as package 219. It requires the Network Message Service features of Meridian Mail release 7. It also requires that the other system be equipped with BCS 36 at a minimum. The package requirements for each node are described in the following tables.

Table 18**Package requirements for the originating node (the node with Message Center users)**

MWI package 219	If connected to DMS (BCS 36) for Interworking
NMS package 175	
BACD package 40 and ACDA package 45	If ACD DN is used as the Message Center DN
ISDN Signaling package 145	
ISDN Primary Rate Access package 146 or ISDN Signaling Link package 147	
ISDN Network Service package 148	
Message Center (MWC) package 46	
End-to-End Signaling (EES) package 10	

Table 19
Package requirements for the host node (the node hosting the Message Center)

MWI package 219
NMS package 175
Integrated Message System (IMS) package 35
ISDN/AP package 77
BACD package 40
ACDA package 45
ISDN Signaling package 145
ISDN Primary Rate Access package 146 or
ISDN Signaling Link package 147
ISDN Network Services package 148
Message Center (MWC) package 46
End-to-End Signaling (EES) package 10
X11 release 19 or later is required.

Table 20
Package requirements for the tandem node (the node that does not have Message Center users)

MWI package 219	If connected to DMS (BCS 36) for Interworking
ISDN Signaling package 145	
ISDN Primary Rate Access package 146 or	
ISDN Signaling Link package 147	
ISDN Network Services package 148	

National ISDN 2 TR-1268 Primary Rate Interface

The National ISDN 2-TR-NWT-001268 Primary Rate Interface (PRI) feature provides an Integrated Services Digital Network (ISDN) PRI interface to the Public Exchange/Central Office that conforms to portions of the National ISDN-2 (NI-2) specification as developed by the National ISDN users Forum (NIUF) and documented in Bellcore Specification TR-1268.

The Meridian 1 supports the following call services on the NI-2 interface:

- Basic call service
- Circuit-mode bearer capabilities (speech, 3.1 kHz audio, 64 kbps digital, and adapted 56 kbps to 64 kbps digital)
- Enbloc sending
- Channel negotiation
- In-band tone and announcement
- Calling number delivery, and
- A back-up D-channel is provided to improve the reliability of an ISDN PRI interface that consists of more than one Digital Signal Level 1 (DS1) facility. The primary and back-up D-channels reside on the 24th channel of separate DS1 facilities. Both D-channels provide signaling information for the interface, but only one can be in service at any given time.

The Meridian 1 does not support the following TR-1268 functionalities:

- Packet Mode Unrestricted Digital Information bearer capability
- Circuit Mode Unrestricted Digital Information at $n \times 64$ kbps, H_0 and H_{11} channels bearer capability (due to the lack of hardware support of providing contiguous timeslots)
- Up to two Calling Party Number information elements for terminating calls
- Up to two redirecting numbers provided for originating and terminating calls

- Subaddressing
- Calling party number privacy on subscription basis
- Call-by-Call Service Selection, and
- Switched DS1/Switched Fractional DS1 Service.

Operating parameters

The existing Network Call Redirection limitation on unsupported interface applies to the NI-2 interface. The Meridian 1 NI-2 interface generates the Redirecting Number (RN) Information Element (IE) of the most recent instance of redirection of an internal call forward call. If the Meridian 1 receives an RN IE at the NI-2 interface, it passes it along. If there are more than one RN IEs, the later ones are treated as duplicates and are discarded.

A maximum of 16 DS1 loops can be supported when both the primary and backup D-channels are configured (i.e., $16 \times 24 - 2 = 382$ B-channels); however, the Meridian 1 is limited to 254 trunks in a single route. Stepping to a second route is permitted only if the Meridian 1 is supported by a far end switch.

The ISDN NI-2 TR-1268 PRI feature requires a DTI/PRI card and D-channel handler card.

Feature interactions

Integrated Service Access (ISA)

Integrated Service Access is not supported on this interface.

ISDN Signaling Link (ISL)

ISDN Signaling Link is not supported on this interface.

Feature packaging

The ISDN NI-2 TR-1268 PRI Basic Call feature is contained in North American National ISDN Class II Equipment (NI2) package 291.

The following packages are also required to activate this feature:

- Integrated Services Digital Network (ISDN) package 145

- 1.5 Mbps Primary Rate Access (PRA) package 146, and
- Multi-purpose Serial Data Link (MSDL) package 222.

Feature implementation

The following two service changes are required for this feature: define a new interface type for a given D-channel; and define the download.

LD 17 – Configure the primary D-channel.

Prompt	Response	Description
REQ	NEW/CHG	Add/change configuration information.
TYPE	CFN	Configuration Record.
ADAN	NEW, CHG, OUT, DCH xx	Add, change, or remove primary D-channel data where: xx = 0,1, ... 63.
CTYP	MSDL	Supported only on Multi-purpose Serial Data Link (MSDL) or Downloadable D-channel cards.
...		
USR	PRI	D-channel mode.
IFC	NI2	NI-2 TR-1268 interface type.
PRI	III nn	III = PRI loop using the same D-channel (0,1,...159) nn = Interface identifier (2,3,...15)
...		

LD 17 – Configure the backup D-channel.

Prompt	Response	Description
REQ	NEW/CHG	Add/change configuration information.
TYPE	CFN	Configuration Record.
ADAN	NEW, CHG, OUT, BDCH yy	Add, change or remove backup D-channel data, where: yy= 0,1, ... 63.

PDCH	xx	Associated primary D-channel, where: xx = 0,1, ... 63.
CTYP	MSDL	Card type.
...		

LD 16 – Use this overlay to define a route data block (for ISDN PRI).

Prompt	Response	Description
REQ	NEW, CHG	New or change.
TYPE	RDB	Route data block.
...		
DGTP	PRI	Digital route type.
IFC	NI2	New DCH interface ID.
...		

Feature operation

No specific operating instructions are required to use this feature.

Network ACD (NACD)

Network ACD allows call centers with multiple locations to solve the problem of fluctuating call traffic. The Network ACD feature uses Integrated Services Digital Network (ISDN) to efficiently and quickly route calls to available agents within a network of Meridian 1 systems. Using the timed overflow routing tables associated with ACD, customers can specify ACD-DNs within the Meridian 1/SL-1 network to which calls should be directed.

Note: This feature is currently incompatible with the similar feature on the SL-100.

NACD is cost effective because calls remain in queue at their original location while waiting for an agent to become available in either the source queue or one of the target queues located throughout the network. Only when an agent becomes available in a remote queue will the call actually be sent over an ISDN voice channel. Prior to the call being sent, communication between locations is handled via the ISDN D-Channel.

The management report information on package C reflects the changes introduced by the NACD feature.

ACD-MAX Release 3 supports the NACD feature. Three new reports and three additional management displays are provided to allow customers to determine call traffic patterns and service levels throughout the network. Centralization of this information will be provided with the introduction of the Network Administration Center. Network Administration Center requires an ACD-MAX in each network location and provides reports and displays on the entire NACD environment.

NACD is not supported on Package D, PDP 11 - Generic 9000 software.

For correct display on ACD-MAX, NACD supports only a UDP numbering plan. CDP will be supported at a later date. It is important to note that the system regular users can operate using one dialing plan (i.e. CDP or UDP) while the NACD operates using another numbering scheme (i.e. UDP with location codes).

Package Requirements

Network ACD package requirements are as follows:

options:
14, 19, 28, 32, 37, 40, 41, 45, 57, (58 or 59), 61, 75, 111, 145,
(146 or 147), 148, 178, 207

Note: Option 11 systems only support Meridian ACD-MAX.

Network Alternate Route Selection

This package allows for efficient alternate routing of calls across the network and provides a uniform dialing plan in an ISDN environment.

Package Requirements

Package requirements are as follows:

BRTE	option 14
BQUE	option 28
NCOS	option 32
FCBQ	Option 117

Network Attendant Service

Network Attendant Service (NAS) provides stand-alone attendant capabilities throughout a network. Any node in the network may have its attendant services located at any other node in the network, part-time or full-time.

Functionality

The activation of Network Attendant Service is controlled by the NAS key on the Attendant Console. When a call is presented to an attendant and the NAS key is not activated, the call receives normal attendant service. If the NAS key is activated, the call receives alternate treatment, based on one of the NAS conditions described below.

Network Attendant Service schedule

The NAS schedule allows a prioritized list of attendant alternatives (attendant locations) to be defined for up to 31 half-hour time periods. Each period can have up to four alternate attendants defined against it. During one of these time periods, a request for attendant service will use one of the alternatives, according to the specified order - the first attendant alternate is attempted, and if all attendants are in Position Busy, the following alternate in the sequence is attempted, and so on.

If none of the attendant alternatives are available, an attempt is made to give local attendant service, which may lead to the application of local NIGHT service.

Night Service

Night Service treatment is defined individually for each node.

With the introduction of NAS routing, identifying whether or not a system is in Night Service becomes more complex. **Table 21** shows when Night Service treatment is in effect. When all the conditions in a vertical column are met, the system is considered to be in Night Service.

Table 21
Determination of Night Service

Local Attendants exist	No	No	No	Yes	Yes	Yes
Local Night active				Yes	Yes	Yes
NAS key active	No	Yes	Yes	No	Yes	Yes
No alternatives in current NAS schedule		Yes			Yes	
All alternatives in current NAS schedule tried			Yes			Yes

Status of local attendants

When NAS routing is active and there is an available attendant at the local switch, the call terminates at the local attendant, if one is available. If a local attendant is not available, the call may either be placed in the local attendant queue (if the Call Waiting threshold has not been exceeded and the console Call Waiting lamp is not flashing), or may receive local NIGHT service.

Alternate routing to attendant positions

Calls can be routed from one attendant to another attendant location in the network. Each node can be programmed with the attendant DNs for up to seven other switches. Up to four of these seven attendant DNs can be used as alternatives for any one time period. Each of the four attendant alternatives for each time period can have Drop Back Busy and/or Off-hook Queuing options configured.

If a call is to be routed to an alternate attendant at another node and all trunks to the other node are busy, the call is queued for an available route to the alternate (if the alternate has the Off-hook Queuing feature). The call remains queued for a specified time, which, upon expiring, causes the call to be directed to the next alternate attendant.

The operation of NAS routing, as controlled by the activation of the NAS key, is summarized in [Table 22](#).

Table 22
NAS Routing Possibilities

	NAS Key	Home Attendant	Night Key	CW Lamp	Trunks to Remote	Action
1	Dark	All Busy	Dark	X	X	Queue to Home Attendant
2	Dark	Not Busy	Dark	Dark	X	Select Home Attendant
3	Dark	X	Lit	X	X	Route to Home Night
4	Lit	Not Busy	Dark	Dark	X	Select Home Attendant
5	Lit	All Busy	Dark	No Flash	X	Queue to Home Attendant
6	Lit	All Busy	Dark	Flash	Not Busy	Route to Remote Attendant
7	Lit	All Busy	Dark	Flash	All Busy	Queue to Home Attendant
8	Lit	X	Lit	X	Not Busy	Route to Remote Attendant
9	Lit	X	Lit	X	All Busy	Queue to route

Drop Back Busy

When a call reaches a Remote node, no attendant is available, and NAS routing or Night Service at that switch is about to be performed (if the Drop-back busy option was set at the originating switch and sent with the call), the call is treated by the originating switch as though no attendant is available at the Remote switch. Another alternative is selected from the originating switch.

Note: Drop Back Busy (DBB) and Remote Virtual Queuing (RVQ) are both packaged under the Originating Routing Control/Remote Virtual Queuing (ORC-RVQ) package 192. If RVQ and DBB are both configured, DBB will take precedence over RVQ. If the user wishes to activate RVQ, DBB must be disabled for a route entry in response to the IDBB prompt. If the user wishes to activate DBB, it must be enabled by entering DBI or DBA.

Attendant Off-hook Queuing

During peak periods, a call may be prevented from reaching a remote attendant if all possible routes to that attendant are busy. If these routes have off-hook queuing, the call will queue on these routes. If activated in the NAS programming and on the route list for the call, queuing occurs before the system attempts other alternatives. The alternatives are tried after the Off-hook Queuing (OHQ) timer expires.

Network Attendant Service capabilities

The following sections describe the network capabilities that are offered as part of NAS.

Break-in

The Break-in feature allows an attendant to enter an established call anywhere in the network and to offer another call or important message to one of the parties involved in the call. Break-in is provided as a key (BKI) function. The BKI key can be pressed before dialing the DN of the required station (pre-dial) or after (post-dial).

When the BKI key is pressed, the following situations may exist:

- **Break-in request recognized** — this is a temporary processing state, that occurs when an attendant tries to break-in to a party at another node, and lasts until the signaling protocol for the break-in attempt is completed.
- **Break-in ignored** — this state occurs if the required party has disconnected at the point of break-in, is idle without the Make Set Busy or Do Not Disturb features active, or is idle with the Call Forward feature active. In all cases, the party is rung, and the attendant can extend the call.
- **Break-in allowed** — the attendant can break into the required party, consult with the required party, and extend another call to the party if (a) the source is an external call, (b) Camp-on is available on the required party, and (c) the established call is a basic call.
- **Break-in denied** — break-in is not allowed if any of the above conditions are not met.

- **Break-in temporarily denied** — the attendant temporarily cannot break-in to the required party, but can try again later. This situation occurs if:
 - the required party is dialing, involved in a consultation call, or is on hold
 - the required party's set is ringing or receiving an indication tone
 - the required party's set is connected to a paging, dictation, recorded announcement, or integrated voice messaging trunk
 - the party to be extended is a local party or trunk with warning tone denied Class of Service
 - network blocking to a remote node has been encountered
- **Break-in consult only** — the attendant can break into the required party, and can consult with the party but cannot extend another call. This situation occurs if:
 - the attendant originates the call
 - the source is an internal call
 - the source is an external call and neither Camp-on nor Call Waiting is possible on the required party
 - the attendant attempts a pre-dial break-in and the required party is busy with Call Forward active.

Call extension

Restrictions that apply to attendants at local nodes also apply to calls extended across the network to remote node attendants.

Attendant control prevents the calling set from disconnecting until the attendant releases. Once the attendant releases or extends and releases the call, attendant control is relinquished.

Timed reminder recalls

Timed reminder recalls are attendant-extended calls that return to the attendant when their timers expire. The timers apply to slow answer calls, camped on calls, and call waiting calls.

When the attendant extends the call to a party at another node, the trunks between the attendant and the source and the attendant and the destination are not taken down after the Release key is pressed. This is true even if tromboning has occurred. This allows the attendant node to monitor the outgoing trunk for an answer signal. If no answer signal occurs within the specified time, the call is presented again to an attendant (or to the original attendant, if Recall to Same Attendant is active on the attendant node).

Anti-tromboning is only invoked after the destination has answered and the attendant has released from the call.

Incoming Call Indication

The Incoming Call Indicators (ICI) will operate in the same manner as a stand-alone Meridian 1 for incoming calls from stations or trunks.

New ICI types are introduced for NAS routed calls for each trunk type. The indicators can be the following:

- a dial 0 call (ordinary or fully restricted)
- a recall request
- a line lockout intercept
- Call Redirection (Call Forward No Answer, Call Forward Busy)
- an interpositional call
- a Listed Directory Number (LDN)
- a Message Center call
- NAS trunk types (type of trunk on which the call came into the originating switch. The choices are: NDID, NCO, NTIE, NFEX, and NWAT)

Attendant Display

Three features which pass information useful for attendant display are:

- Calling Line Identification (CLID)
- Network Call Party Name Display
- Network Call Redirection

For incoming calls, the CLID received (if available), is displayed instead of the Trunk Route Access Code and Trunk Member Number. If the call comes from the private ISDN network and there is a name associated with the calling telephone, the name is displayed on consoles with alphanumeric displays.

Reason for redirection codes are displayed if the call has been redirected by a feature such as Call Forward All Calls.

Camp-on and Call Waiting

Both Camp-on and Call Waiting allow calls extended to a busy set a further opportunity to reach that set. If the call is extended across the network to a busy set, Camp-on or Call Waiting may be attempted in the same manner as in the stand-alone case.

Tenant Service

If Multi-Tenant (TENS) software package 86 is equipped, the table number in the NAS overlay programming can be referenced to an individual Console Presentation Group. Each tenant can have its own individual NAS routing programmed.

Centralized Attendant Service vs. Network Attendant Service

NAS has some similarities to a previous non-ISDN application called Centralized Attendant Service (CAS). There are significant differences as well.

Centralized Attendant Service

- Allows attendants to be centralized at one Main switch connected to Remote switches with Release Link Trunks (RLTs).
- When a remote switch has the CAS feature key activated, incoming calls to the Remote switch are redirected to the Main switch where an attendant answers the call.
- The call comes into the Main switch on an RLT. The attendant can extend the call back to a telephone at the Remote switch. The call is routed on the same RLT trunk which was used when the call came into the Main switch.
- Once the call is ringing at the telephone, the RLT trunk is released.
- If the telephone goes unanswered, the call recalls to the attendant at the Main switch. A Release Link Trunk is used for the recall.
- The CAS feature is activated using a key on a proprietary telephone or console at the Remote switch.
- When users at different switches call each other or the attendant places a call to another switch, normal TIE trunks are used.

Network Attendant Service

- NAS allows several switches to have attendants who answer calls which have been redirected by the NAS feature. The switches are connected with Primary Rate Interface (PRI) or ISDN Signaling Link (ISL) connections.
- NAS routing allows a call destined for the local attendant to be diverted to a Remote attendant. This routing is governed by a NAS schedule, a NAS key, or a permanent NAS Active setting which can be programmed.

- NAS calls can result in tromboned trunk connections between the Remote switch and the Attendant switch. These connections remain until the ringing telephone answers the call. This can result in two tromboned TIE trunks or channels being held up while a telephone is ringing.
- If anti-tromboning has been programmed, the tromboning is corrected after the telephone is answered.
- If the telephone goes unanswered, the call recalls to the attendant at the Main switch. A PRI channel or ISL trunk is used for the recall.
- A NAS key may be optionally programmed on an Attendant Console.
- NAS calls and normal user calls all use the same PRI/ISL trunks.

There are three additional differences between NAS and CAS:

- NAS routing is used when calls waiting in the local attendant queue exceed one of two thresholds. CAS routes all calls to the Main CAS switch.
- NAS chooses an attendant from up to four alternatives per time period. With CAS, each Remote site has only one Main switch to which to route calls.
- NAS routing can also be based on the status of trunks to other nodes and Night Service indicator status. These factors do not affect call routing with CAS.

Operating parameters

NAS and the Centralized Answering Position (CAP) capability are mutually exclusive. A Meridian 1 system may not have an actual attendant console. Instead, the system may be configured to use a Centralized Answering Position (typically, using a Meridian 2616 digital set.) The CAP Directory Number (DN) is the customer Night DN. Since no attendant is configured, the customer is viewed to be in Night Service and any calls for the attendant are directed to the CAP.

An attendant answering position must be an attendant console, and not a Meridian digital set.

NAS and Attendant Overflow Position packages are mutually exclusive and may not be packaged together.

Trunk Group Busy applies only to trunk groups on the node where the attendant resides.

The Uninterrupted Line Connection feature continues to work on a stand-alone switch basis; however, Network-wide Break-in, based on warning tone Class of Service, cannot be guaranteed. Only one Attendant at a time is allowed to break into a connection. Break-in is allowed for telephones only, not trunks or other attendants. Attendant Control is not provided if the connection is a result of a Network Break-in.

Unsupported features

NAS does not support:

- Supervisory Console
- Call Park
- Charge Account
- Do-Not-Disturb and Group Do-Not-Disturb.

The following functions and features are not supported across the network:

- Barge-in
- Busy Verify
- Emergency transfer.

Feature interactions

Attendant Interposition Call

An attendant is not able to call a specific attendant on another node by dialing the attendant DN followed by the attendant number. The attendant dials the Network Alternate Route Selection (NARS), Coordinated Dialing Plan (CDP), or Listed Directory Number (LDN) the same way a telephone dials to reach the attendants at another node.

Busy Verify

Pre-dial Break-in provides equivalent functionality but has several advantages over Busy Verify. Busy Verify does not operate on a network-wide basis.

Call Forward, Break-In and Hunt Internal or External Network Wide

When a call is transferred, a new facility message is sent to the transferred party's node to transport the terminal indicator parameter or the access trunk information parameter.

INIT ACD Queue Call Restore

Call information associated with Network Attendant Service is lost after system initialization and call restoration.

ISDN QSIG Basic Call

ISDN QSIG Basic Call interacts with Network Attendant Services (NAS) as if the call is going to a route without NAS being equipped.

Listed Directory Numbers, Network-wide

This feature enables LDNs to be recognized network-wide when NAS is used. Up to six LDNs can be defined per Meridian 1. The same LDNs must be configured in multiple nodes. The LDN which users dial can be programmed as a CDP number, for example, and input in the NAS overlay as the ID of remote attendants.

Recall to Same Attendant

This feature operates on a network-wide basis for the following call types:

- Slow Answer Recall
- Camp-on Recall, and
- Call Waiting Recall.

The operation of this feature is affected by the programming for the option in the Customer Data Block of the system where the attendant answering the call resides.

Feature packaging

The following packages are required for NAS:

NAS requires the following packages:

- Network Attendant Services (NAS) package 159;
- Advanced ISDN Network Services (NTWK) package 148;
- Network Automatic Routing System (NARS) package 58 or Coordinated Dialing Plan (CDP) package 59;
- Network Class of Service (NCOS) package 32;
- Basic Routing (BRTE) package 14;
- Attendant Break-In/Trunk Offer (BKI) package 127;
- Basic Queuing (BQUE) package 28;
- Flexible Call Back Queuing (FCBQ) package 61;
- Originating Routing Control/Remote Virtual Queuing (ORC-RVQ) package 192 for Drop Back Busy (please see note under “Drop Back Busy” description);
- Integrated Services Digital Network (ISDN) package 145;
- ISDN Supplementary Features (ISDNS) package 161; and
- 1.5 Mbps Primary Rate Access (PRA) package 146 or ISDN Signaling Link (ISL) package 147.

Feature implementation

Configure NAS operation by making changes in LD 12, LD 15, LD 17, and LD 86. Optional functionalities are provided by making changes in LD 93, and LD 16.

LD 12 – Configure Attendant Consoles with NAS keys.

Prompt	Response	Description
REQ	NEW, CHG	New, or change.
TYPE	ATT 1250 2250	Type of console
TN	c u	Terminal Number.
KEY	xx NAS	xx is the key number assigned the NAS function. Each Attendant Console can have only one NAS key defined. This key is optional.

LD 15 – Enable or disable network attendant control, Recall to Same Attendant, NAS routing, and define a TRK ICI key.

Prompt	Response	Description
REQ	CHG	Change existing data block.
TYPE	CDB NET	Customer Data Block. Networking Data. Release 21 gate opener.
CUST	0-31	Customer number.
- OPT	aaa	Options.
- AC2	aaa	Access Code 2 as defined in LD 86.
- ISDN	YES	Integrated Services Digital Network
...		
- NAS	(YES) NO	Specifies whether to (allow) or deny attendant control for call extension.
- NAS_ ACTV	(NO) YES	Specifies whether to allow or (deny) NAS routing.
- NAS_ ATCL	(YES) NO	Specifies whether to allow (YES) or deny attendant control for call extension.
- NAS_ ACTV	(NO) YES	Specifies whether to allow or (deny) NAS routing.

...		
- ICI	xx NCO NDID NTIE NFEX NWAT	Respond with the key number, from 0 to 19, followed by a space, followed by the trunk type. Network CO trunk Network DID trunk Network TIE trunk Network FEX trunk Network WAT trunk
- RTSA	(RSAD) RSAA RSAX	Recall to Same Attendant Denied Recall to Same Attendant Allowed Recall to Same Attendant allowed, with queuing on busy attendant.

LD 17 – Configure the D-channel interface (DCHI) for NAS.

Prompt	Response	Description
REQ	NEW, CHG	New, or change.
TYPE	ADAN	Action Device and Number.
DCHI	xxx	Respond with DCHI number for which NAS signaling is to be allowed or restricted.
NASA	YES (NO)	Specifies whether DCHI is to be allowed or (denied) NAS signaling.

LD 86 – Configure NAS routing.

Prompt	Response	Description
REQ	NEW, CHG	New, or change.
CUST	0-31	Customer number.
...		
FEAT	NAS	Specifies type of data to be changed.

TBL	0–63	Routing table number, from 0 to 63. Without Multi-Tenant Service, 0 is the customer routing table. With Multi-Tenant Service enabled, NAS tables 1-63 may be associated with CPGs 1-63.
ALT	1–7	An alternative attendant or routing table, from 1 to 7. (To clear an old number, type an X before typing the new number. The old number cannot be cleared if it is associated with a schedule period. Reach TODS by pressing the return key.)
ID	xxxxxxxxxxxxxxxx	The dialed digits (including the network access code) needed to reach an attendant associated with the alternative number. Respond with a string of up to 16 digits to change the attendant ID; press the return key to leave the ID unchanged, exit the prompt, and return to ALT.
TODS	0–31	Specifies a schedule period, from 0 to 31, where 0 is the default to handle all time periods not defined in 1 through 31. Type an X before a period number to remove the schedule period. (Typing an X before a 0 clears all associated alternatives, leaving the default treatment as local attendant treatment.) Press the return key to continue the NAS feature setup process.
- PER	HR:MIN HR:MIN	Specifies the start and stop times for the period using 24-hour format. Start time must be before the stop time, and minutes can be only 00 or 30. Press the return key to leave times unchanged and move to the DAYS prompt.
- DAYS	D, D, ... D	Specifies applicable days of the week for the time period. Respond by inputting a number representing each day for which the schedule is active (where 1=Monday, 2=Tuesday,...7=Sunday). Type an X before the day number to deactivate the schedule period for that day. No more than seven entries are permitted on an input line. Press the return key to leave this schedule unchanged and move to the next prompt. (If not otherwise specified, a schedule period is assumed valid for all days.)
ALST	xxxx	Alternative list to be used for the schedule period. Respond with up to four alternative numbers in the order in which they are to be attempted. (These numbers are defined using ALT.)

DBK	Z Z Z Z	Alternatives for which “drop back busy” is to be active during this period. Respond with four entries of Y (allow) or N (deny) for the alternative evoked by the previous prompt. Responses are applied in sequence.
QUE	Z Z Z Z	Specifies alternatives for which queuing to a route is to be allowed during this period. Respond with four entries of Y (allow) or N (deny) for the alternatives evoked by ALST. Responses are applied in sequence. If the response is Y, off-hook queuing must already be configured for calls to be queued on this route.

LD 93 – Assign a NAS routing table to Console Presentation Groups.

Prompt	Response	Description
REQ	NEW, CHG	New, or change.
TYPE	CPG	Console Presentation Group.
CUST	0-31	Customer number.
CPG	1-63	Console Presentation Group number.
CPGS	(NO) YES	Customer Presentation Group Services.
ROUT	0-511	Route number.
TEN	1-511	Tenant number.
NTBL	(0) - 63	NAS routing table to be used for calls directed to this Attendant Console Group(ACG)/ Console Presentation Group (CPG).

LD 16 – Allow or deny pre-answer tromboning (allow or deny an incoming call to be directly routed back on the same route).

Prompt	Response	Description
REQ	NEW, CHG	New, or change.
TYPE	RDB	Route Data Block.
CUST	0-31	Customer number.
ROUT	0-511	Route Number.
TKTP	aaa	Trunk Type requires response when REQ=NEW.
TRMB	(YES) NO	Tromboning. NO = Tromboning denied. Incoming trunk call on route may not be routed back on same route. YES = Tromboning allowed. Incoming trunk call on route may be routed back on the same route. Only applies to calls routed using NARS/BARS or CDP. Does not apply to calls redirected by Hunt, Forward All Calls, or Forward No Answer.

Note: The anti-tromboning capabilities programmed in LD 16 only apply to attendant extended calls.

NAS performs tromboning when required regardless of the LD 16 programming. However, if redundant (or tromboned) trunk connections are to drop after the telephone is answered, this prompt must be set to NO across the network where this might occur.

Example of NAS implementation

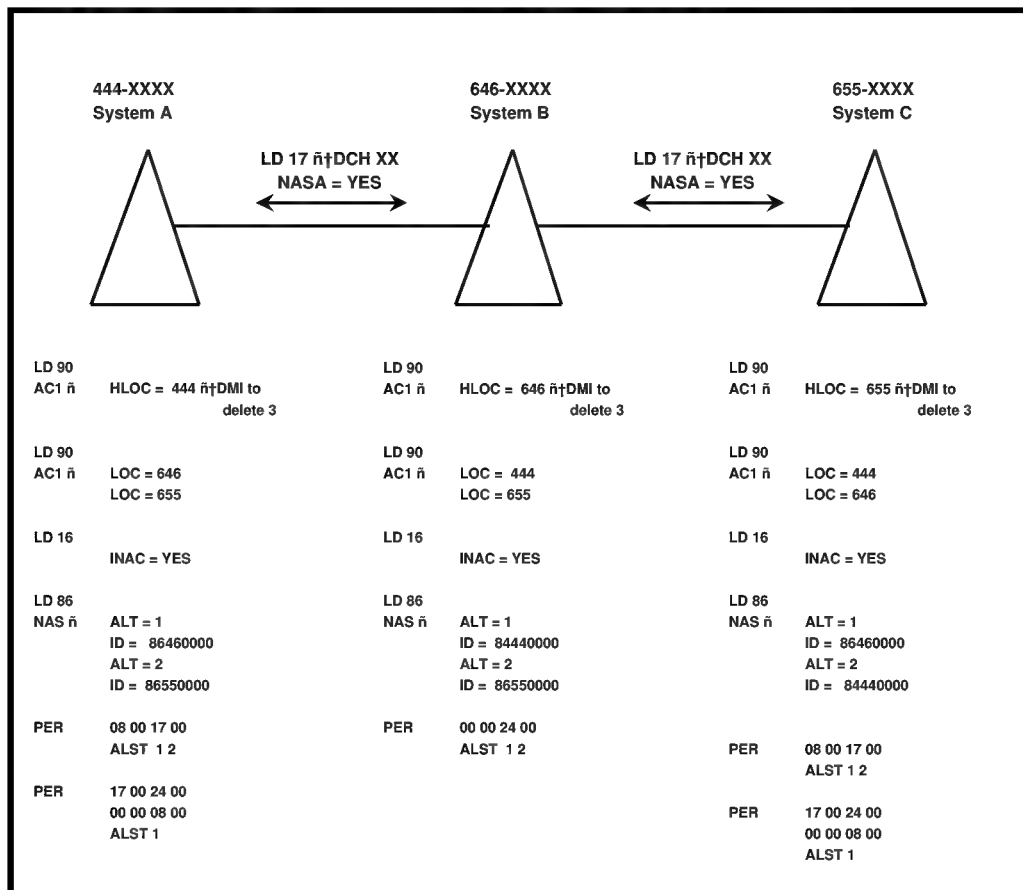
Figure 14 illustrates a simple application of the NAS functionality in a private ISDN PRI network connecting three Meridian 1 systems. Although this example uses NARS, the same functionality can be accomplished using CDP.

Each system has the translations in place for a HLOC and the two LOC codes for the other two Meridian 1 locations. This programming was done in the NARS database. The route lists required in order to process these types of calls have been programmed also.

The INAC implementation was part of the basic ISDN/Networking programming.

The NAS programming involves the configuration of the D-channel for NAS functionality, the ID of the other attendants to be used, a list of the sequence in which these attendants are to be scanned for availability and the time periods for each list.

System B, in this example, is the location where attendants should be available 24 hours a day. During the day, the other two locations are programmed to use System B as their first choice backup and then as a second choice System A uses System C and System C uses System A. At night, Systems A and C use System B as the only backup. If it is unavailable, calls will be given Night Service.

Figure 14**A simple application of NAS functionality in a private ISDN PRI network****Feature operation**

There are no operating procedures specified for this feature.

Network Call Party Name Display (NCPND) and Network Name Delivery (NND)

Network Call Party Name Display (NCPND) offers a network-wide visual display of the Calling Party and Called Party Names on telephone sets with Alpha-Numeric Displays.

Across the ISDN DTI/PRI network, the NCPND feature displays the following:

- the calling party's name on the terminating set
- the called party's name on the originating set

With this feature, each Meridian 1/SL-1 PBX in the network can contain the name and number of each user on that particular PBX. In the call set-up message, the originating PBX will send the CLID and calling party name to the terminating PBX. When the call is answered, the terminating PBX will send back the connected number and name.

For call redirections, the Dialed Name Display option may be selected via a service change which would provide a display of the redirecting name instead of the calling name for the set which is answering the redirected call. The originating set's display is not affected by the use of this option.

With X11 Release 16 and earlier, the NCPND feature may only be used for private network applications that support the Meridian 1 to Meridian 1 connection (SL-1 and SL-100). The name and number display for the called party is visible for the duration of the call. The name display is retained for the calling party, however, the number will be replaced by the trunk route and member if the call is placed on hold and then later retrieved.

With X11 Release 18 and later, Network Name Display Interworking allows caller and calling party name display in Meridian 1 connections to DMS-100, DMS-250 and Meridian 1 Options 11-81.

The following sets support the NCPND feature:

- M2250 Attendant Console

— Meridian Modular Telephones

- M3000 Touchphone
- M2317
- M2008 with Display
- M2616 with Display
- M2016S with Display
- M2216

Please consult the telephone User Guides to determine the exact display for each particular set.

Network Name Delivery (NND) is the method used to send the names and numbers across the network. There are two NND methods available: ND1 and ND2.

Operating parameters

Network Name Delivery method 1 (ND1) is available in X11 release 14 and later. The following list describes ND1 operating parameters.

- Meridian 1 to Meridian 1 connections only are supported.
- For X11 release 14, ND1 supports name display for redirected calls by Call Forward All Calls.
- With X11 release 16, ND1 supports the name display for call redirection by Call Forward No Answer, Hunt and Call Pickup if the redirection is done across the network. See “Network Call Redirection” in this chapter for configuration.
- If the called party is at a remote switch, the called party name is displayed on the caller's display only after the call is answered unless there was a redirection. (See Network Call Redirection in this chapter for a discussion of call redirection with X11 release 16 and later hardware.)
- A CPND enhancement allows the display of the redirecting name on the terminating telephone instead of the calling name by a service change option only if the first redirecting party is on the terminating switch.

- Prior to X11 release 16, ND1 supports the name display for call transfer only for a local transfer over PRI. In that case, the name is displayed on the terminating telephone.
- The maximum number of characters in a displayed name is 24.

Network Name Delivery method 2 (ND2) is available in X11 release 18 and later. ND2 provides network-wide name display in compliance with the Meridian Customer Defined Networking (MCDN) protocol.

The following list describes the ND2 operating parameters.

- ND2 supports direct PRI connections to Meridian 1 (with X11 release 18 and later), SL-100, and DMS (with BSC32 and later software).
- For Meridian 1 to Meridian 1, the maximum number of characters in a displayed name is 24. When connecting to a Central Office, 15 characters only are supported. Names exceeding this length are truncated.
- ND2 supports name delivery for Call Pickup, Call Transfer, Hunt and Call Forward All Calls/No Answer/Busy.
- A CPND enhancement allows the display of the redirecting name on the terminating telephone instead of the calling name by a service change option only if the first redirecting party is on the terminating switch.
- In all cases when the name is available, the called party name is displayed on the caller's display during the ringing phase. This is an enhancement over ND1 which displays names on connect.
- ND2 enhancements are not supported on connections to Meridian 1 using ND1. ND1 is applicable for X11 prior to release 16. ND2 is recommended for X11 release 18 and up. The far ends must match.

Package Requirements

Network Call Party Name Display requires the following:

ISDN	option 145
PRI	option 146 or ISL option 147
CPND	option 95 and DDSP option 19

In addition, the appropriate digital set options (Telset package 88, 89 and 91 or 170) must be equipped to support the M3000, M2317 and Meridian Modular telephones.

Network Call Redirection (NCRD)

Network Call Redirection allows calls to be redirected across the ISDN network as a result of Hunting, Call Forward All Calls and Call Forward No Answer. (These features, with the exception of call forward all calls, used to be limited to the PBX of the called set).

Impact on CLID and CPND For both CLID and CPND, updated information is provided to both the calling and the called set's display when the call is redirected. With this enhancement, the display of the calling party shows the connected number when the call redirected to another number in the ISDN network.

If Network Calling Party Name Display (NCPND) is optioned, the calling party's set also displays the connected party's name. If a call is forwarded more than once, the calling party's set displays only the first re-directed number and name and the connected number and name.

Redirection reason

With Network Call Redirection, the terminating set displays the CLID from across the DTI/PRI network as well as the forwarded set's number. If NCPND is optioned, the calling party's name and number as well as the originally called party number is displayed at the terminating set. In addition, the sets of the calling and terminating parties will display the redirection reason (CFWD, CFNA, HUNT, PKUP, XFER).

Network Call Redirection also allows the customer to either block calls from being redirected over the network, or limit the number of redirections from 1 to 5 times per call.

Network Call Transfer and Attendant Extended Calls

Network Call Transfer and Attendant Extended Calls display the calling party name and number to the “Transferred to”/“extended to” party across the network. Also, if NCPND is optioned, the calling party's display is updated to show the connected party's name and number.

Note: Network Call Transfer over PRI does not provide the ESN Network Transfer feature. This feature eliminates tandem trunk connections that double back over the same route. PRI Network Transfer merely allows calls to be blindly transferred across the ISDN network.

Network Hunt

The Network Hunt feature extends the current capabilities of Hunt to a Meridian 1 network using either ISDN Primary Rate Interface (PRI) or ISDN Signaling Link (ISL). Also, the displays of originating and terminating sets of a redirected call are updated to correctly present information and the reason for redirection (Hunt).

For example, in a three Meridian 1 ISDN Network, when a user on site “A” calls a user on site “B” but is forwarded to site “C”, site “A” and site “C” set displays are updated. Site “A's” set shows the originally dialed number, the connected number (site “C” number), and the reason for redirection (i.e., Busy). Site “C's” set shows the calling number and name, the originally called number (site “B” number), and the reason for redirection.

Network Intercom (Hot Type D and Hot Type I Enhancements)

Hot Line enables a designated telephone to place calls to a predetermined destination that may be internal or external to the Meridian 1. The call does not require attendant intervention. When the handset is lifted, or when a preprogrammed key is activated, the system speed calls a preprogrammed DN. Hot Lines access a set of Terminal Numbers programmed by direct entry using LD 11, or by list entry such as System Speed Call (SCC) using LD 18. Once a Hot Line call enters the ringing state, it is the same as a normal call.

Prior to Release 21, there were two types of Hot Line keys (DN-based Hot Type D, and Speed Call List-based Hot Type L). Release 21 introduces another type of Hot Line key – Hot Type I, while also providing improvements to the existing Hot Type D. These two improvements function in both standalone and network environments.

Hot Type D provides the ability for Meridian Digital Telephones to have two-way calls on specially designated keys (not on the DN keys) with other Meridian Digital Telephone sets connected to Meridian 1 PBXs across a Meridian Customer Defined Network (MCDN) Integrated Services Digital Network (ISDN). A Hot Type D call can now terminate in three different modes: Voice, Ringing, and Non-ringing. With the Voice mode, speech path is automatically connected after a short ring. With Ringing and Non-ringing modes, the call must be manually answered by the called party; the difference between the two modes is that for Non-ringing no audible tone is given (the Hot Line key flashes to indicate the call).

Hot Type I

An option is available with Hot Type I to provide a No Answer Indication informing the called party that a Hot Line call was made during the called party's absence. If an Hot Line call cannot be completed on the Hot Line key, the calling party is informed via the set's display, and the call is completed over the network as a normally dialed call that attempts to terminate on the destination Prime DN.

Hot Type D Enhancement

Hot Type D allows more than one set having the same target DN defined for the Hot Type D key. This enhancement includes Voice, Ringing, and Non-ringing termination modes, and the capability to leave a No Answer Indication in some situations (i.e., the Hot Line key winks). A call terminating on an enhanced Hot Type D key operates the same as if terminating on a Hot Type I key, if the originating DN is the same as the target DN defined for the key. If it is not the same, but another Hot Line key exists on the set that has a target DN that matches the originating DN, a No Answer Indication is left on that key.

Operating parameters

Hot Type I calls are not allowed on analog (500/2500 type) telephones.

Hot Line keys cannot be defined for M3000 sets.

A Hot Line key should not be defined on a station without a Prime DN and likewise should not be defined on the primary key. If this is not done, the improved functionality will not work and the call is treated as a non-Hot Line call.

The network DN for Hot Type I and the No Answer Indication component of Hot Type D must be either a Coordinated Dialing Plan or a Universal Dialing Plan number that must terminate on a Prime DN of a Meridian Digital Telephone set; otherwise, the call is competed as a non-Hot Line call.

The network-wide application of Hot Type I is only applicable to nodes in a Primary Rate Interface (PRI), ISDN Signaling Link (ISL), Virtual Network Services (VNS), and Basic Rate Interface network. The originating and terminating nodes of the Network Intercom (Hot Type D and Hot Type I Enhancements) feature must be Meridian 1 switches running a minimum of Release 21 software. Tandem nodes in the private network must be Meridian 1 (minimum Release 21 software) or another MCDN node able to transfer Remote Operations Service Element (ROSE) facilities.

Hot Line keys must be defined with the same dialing plan.

The Hot Type D enhancements can also function across R2MFC trunks provided that the calling party's DN is provided.

Feature interactions

Attendant Blocking of DN

A Hot Type I key cannot be blocked by the attendant, because it has no DN.

Pressing a Hot Type D key that is attendant blocked establishes the call on the source side of the attendant.

Automatic Call Distribution (ACD)

Hot Type I calls cannot terminate on an ACD DN. A call attempting to terminate on an ACD DN receives overflow tone. Hot Line calls involving ACD sets must use the Hot Type D option.

Busy Forward Status (BFS)

In a Secretarial filtering scenario, the secretary's BFS lamp also will reflect that the boss' set is busy if the boss is on a Hot Type I call.

Call Forward

Hot Type I calls respect or override all kinds of Call Forward features (Busy, No Answer, All Calls, Internal, etc.) according to per-set definitions. If Call Forward is respected, the call becomes a normally dialed call and the originator will receive the appropriate indication on their display.

Call Join

Hot Type I calls can be moved to the Conference key with the Call Join feature.

Call Park

Hot Type I calls cannot be parked.

Call Party Name Display

Hot Type I calls display names the same as a normal call.

Hot Type I calls that become a normal call indicate on the originating station's display that the call is no longer a Hot Line call.

Call Pickup

Hot Type I calls cannot be picked up. An attempt to pick up a Hot Type I call results in an overflow tone.

Call Transfer

Hot Type I calls may be transferred to another Hot Line key or to a normal DN key; likewise calls on a normal DN key may be transferred to a Hot Line key.

Display Key

Hot Type I calls are supported by the Display key feature; pressing the Display key and then the Hot Type I key will show the target DN on the originating station's display.

Do Not Disturb (DND)

Hot Type I calls ignore the Do Not Disturb feature. Hot Line calls are presented to the defined target, even when DND is activated.

Last Number Redial

A Hot Line key cannot be redialed using the Last Number Redial feature.

Make Set Busy

Hot Type I calls terminating on a station in the Make Set Busy mode override Make Set Busy.

Multiple Appearance Redirection Prime (MARP)

If more than one set is allocated the same prime DN, the Hot Type I call will terminate on the set designated as the Multiple Appearance Redirection Prime (MARP). If the MARP DN is not the prime DN on the set, or if the set designated as the MARP DN is not a Meridian Digital Telephone set, the first Meridian Digital Telephone set with the prime DN will be used. If none of these conditions are met, the call will terminate as a non-Hot Line call and the calling party will be notified on the display.

Hot Type D calls can have voice termination only on a MARP Terminal Number (TN), or if there is no MARP TN, then on the first TN in the TN list. A No Answer Indication for Hot Type D can only be left on the MARP TN, or if there is no MARP TN, then on the first TN in the TN list.

Override

An internal Hot Type I call never returns busy, unless the call became a non-Hot Line call due to the Hot Line key being busy. In this case, the call behaves like a normally dialed call, and override can be used upon receipt of a busy signal.

Ring Again

Hot Line calls terminating on a busy key become normal calls. Hence, they may use the Ring Again feature under normal circumstances.

Ring Again – No Answer

If Ring Again No Answer is activated for a Hot Type I call, it is activated as if the call had been dialed normally.

Vacant Number Routing

Hot Types I keys and enhanced Hot Type D keys support vacant number routing.

Feature packaging

The Network Intercom (Hot Type D and Hot Type I Enhancements) feature is included in Enhanced Hot Line (HOT) package 70.

For Hot Type I in an ISDN network the following packages are required:

- Advanced ISDN Network Services (NTWK) package 148
- Integrated Services Digital Network (ISDN) package 145
- and at least one of 1.5 Mbps Primary Rate Interface (PRA) package 146, Integrated Services Digital Network Signaling Link (ISL) package 147, and Virtual Network Services (VNS) package 183.

R2MFC connectivity for Hot Type D requires:

- Multifrequency Compelled Signaling (MFC) package 128.

Feature implementation

LD 11 – Define Hot Type D and I keys and Classes of Service as follows:

Prompt	Response	Description
REQ	NEW, CHG, OUT	Configure, change or remove.
TYPE	aaaa	Telephone type where aaaa cannot = M3000.
TN	c u	Terminal Number for the Option 11.
...		
CLS	FICA (FICD) NAIA (NAID)	Forward Hot Type I allowed. Forward Hot Type I denied. No Answer indication allowed. No Answer indication denied.
...		

KEY	nn HOT D dd target_num hot_dn R/V/N/(H)	Two-way Hot Line Key. dd = number of digits dialed. target_number = terminating DN (31 digits maximum). Hot_dn = two-way Hot Line DN. Termination mode: R = Ringing V = Voice N = Non-ringing, and H = Hot Line (the default).
KEY	nn HOT I dd target_number (V)/N/R	Hot Line key. dd = number of digits dialed. target_number = terminating DN (31 digits maximum). Termination mode: V = Voice (the default) N = Non-ringing, and R = Ringing.

LD 95 – Configure the Calling Party Name Display:

Prompt	Response	Description
REQ	NEW, CHG	Configure or change.
TYPE	CPND	Calling Party Name Display.
CUST	0-31	Customer Number.
...		
NITC	aaaa (NI)	Non-Hot Line call. Indicates that the Hot Line call terminated as a normal call.

Feature operation

Press the Hot Type I or D key to initiate an Hot Line call to a target DN (the DN may be an external DN in an MCDN ISDN network).

The called party answers the call by pressing their Hot Type I or D key if configured. If the called party has no Hot Type I or D key configured, the call will behave as a normal call and is answered accordingly.

If the called party does not answer, and has No Answer Indication Allowed Class of Service, the Hot Type I or Hot Type D key will be winking as a form of No Answer Indication.

Network Message Services - Meridian Mail

Network Message Services - Meridian Mail allows a single Meridian Mail system to serve multiple network sites. Network Message Services offers network users complete call coverage regardless of their location in the customer's ISDN network. Users at any location in the network may access the Meridian Mail system as easily as if it were at their own location.

Option 11 systems can use this feature, but only as an originating remote site or a tandem node. The Option 11 cannot be the location that actually possesses the Meridian Mail hardware.

Access to Meridian Mail features is unchanged, regardless of whether Meridian Mail is being accessed by a user at the same location as Meridian Mail or by a user at a different location from the Meridian Mail system.

For example, with Network Message Services, an unanswered call to a user is forwarded across the ISDN network to Meridian Mail, which plays the user's mailbox greeting and takes the message. Meridian Mail then directs the Meridian 1/SL-1 serving the user to check the status of the user's message waiting light and turn the light on if necessary. Message waiting indication for users of 500/2500 sets is supported as well. The user accesses Meridian Mail and retrieves messages as usual.

Meridian Mail uses its unique link with the Meridian 1/SL-1 to match calling and called number information to user mailbox information as appropriate. Customers can centralize administration of Meridian Mail resources while still offering voice messaging to users throughout the network. Network Message Services enables customers to offer voice messaging to smaller network locations that might not be able to justify the purchase of a dedicated Meridian Mail system. All users have complete feature functionality, including message waiting indication and personal verification across the network.

Network Message Services complements other Meridian Mail options such as Meridian Mail networking by allowing customers maximum flexibility in providing voice messaging services to network users. Furthermore, shared and dedicated Meridian Mail systems can be linked via Meridian Mail networking, providing complete voice messaging access for all users on the network.

Network Message Services extends the value of ISDN Primary Rate Interface and ISDN Signalling Link networks by allowing shared access to Meridian Mail resources. The resources are used more efficiently and additional services are offered to network users.

Note: Password Suppression is not supported across a Meridian 1 network.

Package Requirements

Meridian 1/SL-1 requirements for NMS-Meridian Mail vary slightly, depending on whether the Meridian 1/SL-1 originates calls to the Meridian Mail location, terminates calls to the Meridian Mail location, or simply serves as a tandem node in the network, passing information between “originating nodes” and “terminating nodes”.

Note: All the NMS node types must be equipped with their respective packages listed on the next two pages.

“Originating” node requirements are as follows:

- ISDN Primary Rate Access or ISDN Signalling Link (Option 145/146 or 145/147) and associated prerequisites
- Advanced ISDN features (Option 148)
- Network Message Services (Option 175)
- Message Center (Options 40, 45, 46)
- End-to-end signalling (Option 10)

“Tandem” node requirements (not currently available on Option 11) are as follows:

- ISDN Primary Rate Access or ISDN Signalling Link (Option 145/146 or 145/147), and associated prerequisites.

- Advanced ISDN features (Option 148)
- End-to-End signalling (Option 10)

“Terminating” node requirements are as follows:

- ISDN Primary Rate Access or ISDN Signalling Link (Option 145/146 or 145/147), and associated prerequisites.
- Advanced ISDN features (Option 148)
- Network Message Services (Option 175)
- End-to-end signalling (Option 10)

Meridian Mail prerequisites:

- Auxiliary Processor Link (Option 109)
- IVMS Link (option 35)
- Meridian Mail Link (Options 77, 85)
- Basic ACD Features (Options 40, 45, 83)
- Message Center (Option 46)

Meridian Mail must be equipped with Release 7 software and the Network Message Services software option package. The Meridian Mail system should also be engineered to support the total number of users expected to be served throughout the network. Generic X11 Release 16 is a prerequisite.

Network Message Services - Message Center

Network Message Services - Message Center extends the Message Center function to permit remote locations in a customer's network to be served by a single message center. Software messages are transported among Meridian 1/SL-1 PBXs via ISDN Primary Rate Interface or ISDN Signaling Link.

A caller to a station on one Meridian 1/SL-1 can leave a message with a Message Center located on another Meridian 1/SL-1 in the network. All existing Message Center types — message attendant, sets, and ACD sets — are supported.

Network Message Services - Message Center was developed to be transparent to end-users. Callers to a busy or unanswered station using sets without displays will not be aware that their call is being answered by a message center at another PBX location. The message center sends an indication of a message waiting to the user's station using the same mechanisms as are in place today (such as indication lamp or LCD key lamp). Users can call and retrieve their messages by simply pressing the Message Waiting Key on their telephone sets.

Package Requirements

Network Message Services requires the following:

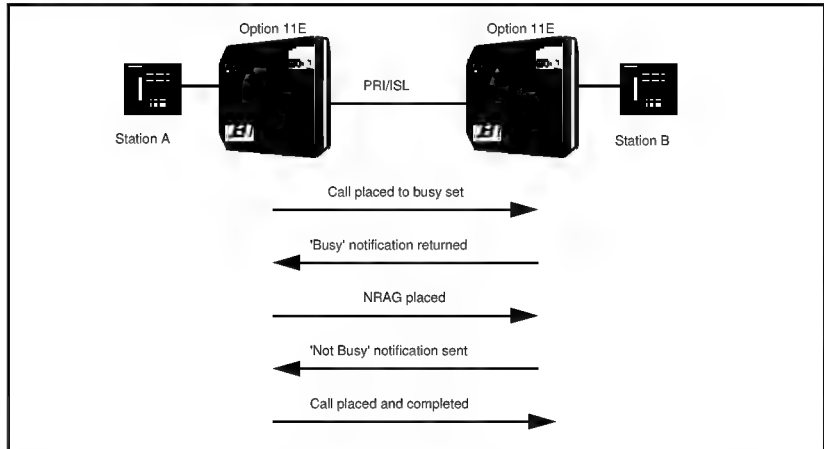
ISDN	option 145
PRI	option 146 or ISL option 147
NMS	option 175
NTWK	option 148

Note: If an ACD type Message Center is to be used, ACDA package #45 is required. The combination of packages # 46 (MWC), #40 (BACD), # 45 (ACDB) and # 42 (ACDC) provides ACD features and reports for the ACD type Message Center.

Network Ring Again

Network Ring Again operates on stations called over the ISDN PRI/ISL network. The Network Ring Again feature allows a caller on station "A" encountering a busy signal at station "B" to be notified when the busy station "B" becomes available. This feature works on calls placed anywhere in the ISDN network. When user "A" accepts the "not busy" recall, a normal call setup is then placed to destination "B" without user "A" re-dialing the called number. **Figure 15** illustrates this situation.

Figure 15
Network Ring Again



Network Ring Again (NRAG) can be originated by a station in the Make Set Busy mode, and is also allowed to be activated against a station in the Make Set Busy Mode.

Network Ring Again is supported in UDP and CDP networks. Network Ring Again is only supported if the originating set sends for CLID.

Please note that NRAG does not operate on redirected calls. NRAG requires that every switch in the network be equipped with either NARS or CDP software.

Package Requirements

The package requirements are as follows:

ISDN	option 145
PRI	option 145 or ISL option 147
Advanced Features (NTWK)	option 148

Network Wide Listed Directory Numbers

Listed Directory Numbers (LDNs) can be defined as Incoming Call Identification (ICI) keys on an Attendant Console, making it possible to have different presentations when different DN's are dialed.

Previously, it was only possible to define four LDNs on a Meridian 1. This feature makes it possible to define six LDNs on a Meridian 1.

Prior to Release 20, when an LDN call was routed from one node to another, the call was presented as per trunk type (e.g., NDID, NTIE, NCO, NFEX, or NWAT). The call was presented on LDN key zero if none of these ICIs was configured. With this feature, if the dialed DN is an LDN and an LDN key exists corresponding to the dialed LDN, the call will be presented on that ICI LDN key.

This feature also enables LDNs to be recognized network wide when Network Attendant Service (NAS) is used. The same LDNs must be configured in multiple nodes. Network LDN is defined on a customer basis.

Operating parameters

The network part of this feature works in a Meridian Customer Defined Network (MCDN) environment with NAS configured.

The LDNs to be used network wide cannot be used in conjunction with Distant Steering Codes.

No new hardware is required for this feature.

Feature interactions

Feature interactions for Network Wide Listed Directory Numbers are described below.

Call Forward No Answer

With this feature, the LDN ICI has a higher priority than CFNA ICI. When a call is forwarded to an LDN via Flexible DN, the call will be presented on the LDN ICI.

Departmental Listed Directory Number

Departmental LDN is not supported over the network; however, this feature does provide two more LDNs for the DLDN feature.

Console Presentation Group

This feature provides two more LDNs per Console Presentation Group.

Console Operation/Console Presentation

Console Operation makes it possible for each console to select which ICI call types will be presented to the console. Network wide LDN does not work with the Console Presentation feature because it is not supported by NAS. Console Operation can, however, be configured with two new LDNs.

Network Message Center

With this feature, the LDN ICI has a higher priority than MWC ICI. When a call is forwarded to an LDN over the network to a message center, the call will be presented on the LDN ICI.

Network Attendant Service

The way the network LDN calls are presented in a NAS environment is changed by this feature. The presentation on the NDID, NTIE, NCO, NFEX or NWAT, and the LDN0 key is changed to the correct LDN key, if it exists. Otherwise, it will be presented as it previously was on the NDID or LDN0 key.

Console Operation/Queue Thermometer

The queue thermometer indicates how many calls are in the queue for a certain ICI key. An ICI key can correspond to more than one ICI type. Even though the ICI type of a call may be different with or without this feature active, it will not interact with queue thermometer operations.

Centralized Attendant Service

Centralized Attendant Service (CAS) is mutually exclusive to the NAS package. As the network wide LDN feature requires NAS for its networking functions, the network part of this feature will not work with CAS, but the two extra LDNs can be used locally.

Feature packaging

For standalone environments, there are no new software packages for this feature as it is included in basic packaging.

Since Network Wide LDN requires Network Attendant Service routing, the following existing software packages must be provisioned: Network Attendant Service (NAS) package 159; Network Alternate Route Selection (NARS) package 58; Network Class of Service (NCOS) package 32; Basic Routing (BRTE) package 14; and applicable ISDN options depending upon customer requirements.

To use the attendant queue thermometer, Console Operations (COOP) package 169 must be provisioned.

For Departmental LDN to be configured with six LDNS, Departmental LDN (DLDN) package 76 must be provisioned.

NI-2 Call By Call Service Selection

The National ISDN-2 (NI-2) Call By Call (CBC) Service Selection feature provides a standardized version of call by call service over an NI-2 TR-1268 interface¹, as defined in the Bellcore Technical Reference Specification TR-NWT-001270. It is intended that NI-2 CBC apply to all Class 5 type local exchanges complying with the NI-2 TR1270 standard.

Prior to the introduction of this feature, proprietary call by call capabilities were offered by Nortel's Integrated Services Access feature (ISA) Call By Call Type service for DMS switches (such as the DMS-100), and Lucent's Call By Call Service Selection for 5ESS Local Exchange Carriers. [Table 7, "Differences between Nortel's ISA, Lucent's CBC, and NI-2 CBC,"](#) on page 340 provides a summary of the functional differences between the three offerings.

Note: The ISA Call By Call Type service and the NI-2 Call By Call Service Selection feature can co-exist on the same PBX.

NI-2 Call By Call Service Selection allows multiple service routes to share the same common pool of B-channels, rather than using dedicated routes that require each service route to have its own trunks. The channels are assigned to a service on a per call basis.

[Figure 9](#) depicts a configuration using dedicated facilities, while [Figure 10](#) shows an NI-2 Call By Call Service Selection configuration. [Figure 11](#) provides a graphical representation of the NI-2 CBC master route and service routes.

1. The NI-2 Call By Call Service Selection feature provides all of the NI-2 TR-1268 Basic Call services introduced in Release 21. Please refer to the 'National ISDN-2 TR-1268 PRI Interface' feature module in the 553-2901-100 NTP for a description of the services that are offered.

Figure 9
Dedicated facilities configuration

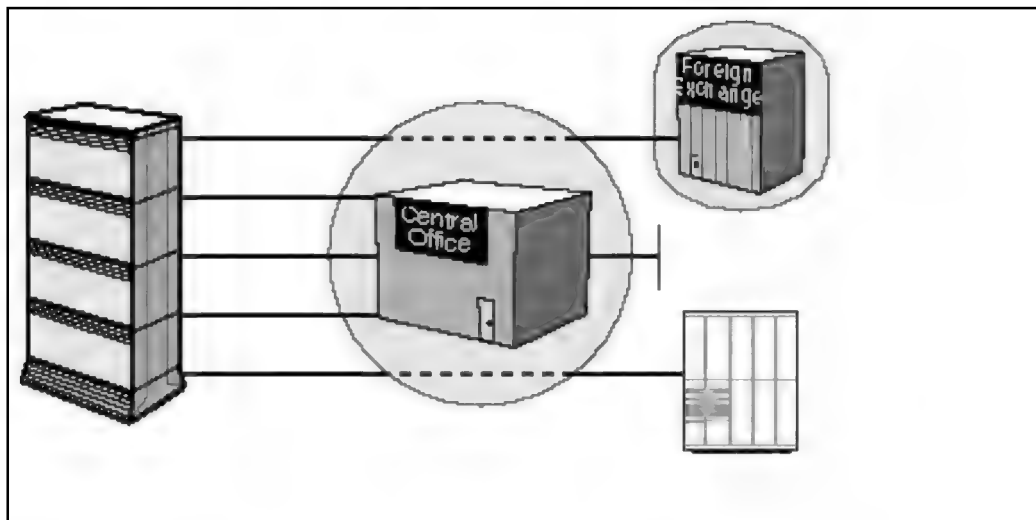


Figure 10
NI-2 Call By Call Service Selection configuration

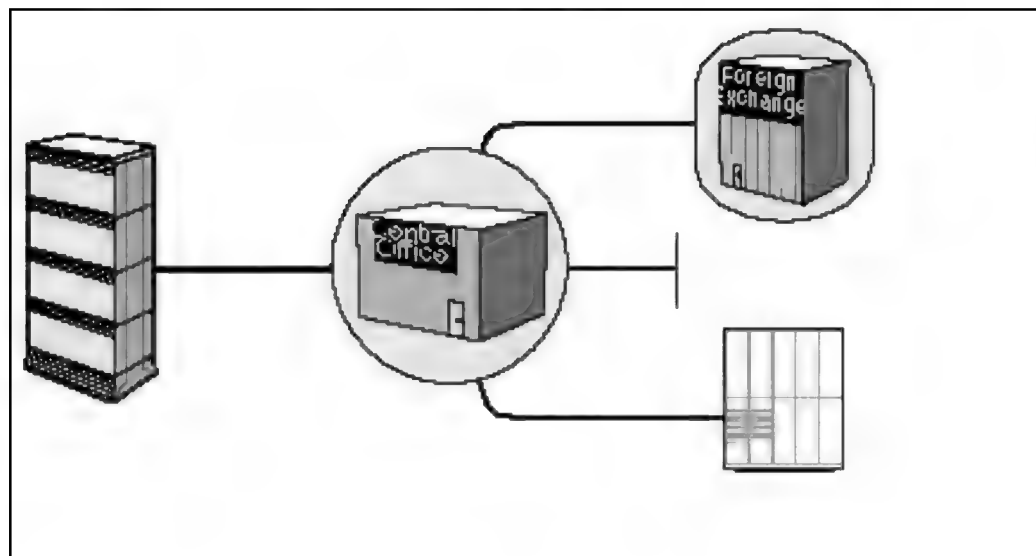
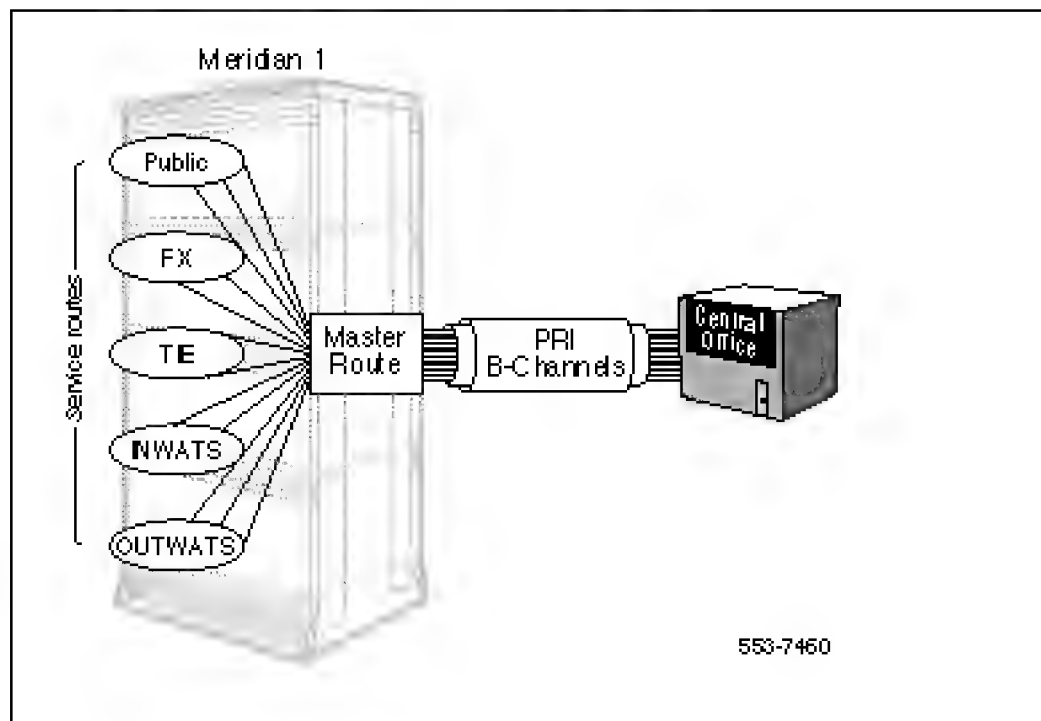


Figure 11
NI-2 CBC master route and service routes on the Meridian 1



Provisioning a master route and service routes

NI-2 Call By Call Service Selection is provisioned by configuring a trunk route as an NI-2 Call By Call Service Selection master route, and associated service routes. A master route contains a list of B-channels (trunks) to be shared by the different service routes. Service routes do not have dedicated trunks. They are associated with the master route and share trunks for different Call By Call services. Calls from the Central Office to the Meridian 1 are offered over the CBC master route.

The NI-2 CBC master route is defined in Overlay 16. The associated list of B-channels (trunks) is defined using Overlay 14. Then, the service routes are configured, also using Overlay 16. When configuring the service routes, the type of service to be carried over the B-channels for the NI-2 PRI interface is defined as a decimal value, as follows:

0 = Public call service (No Network Specific Facility IE is sent, since COT/DID routes are used)

19 = FX (Foreign Exchange) service

20 = TIE service

17 = Inward Wide Area Telecommunications Service (INWATS) service

18 = Outward Wide Area Telecommunications Service (OUTWATS) service. Information pertaining to the band number and the Inter-Exchange Carrier is stored in the service route. Three OUTWATS services may be accessed:

- IntraLATA OUTWATS, provided by a local service provider
- InterLATA OUTWATS, provided by a carrier other than that of the local service provider and
- Banded OUTWATS, using bands which each represents a geographical area to which a subscriber can place a call at a special tariff level

Lucent proprietary call by call services are as follows (these values are defined in the facility coding field in the NSF IE in order for the Meridian 1 to recognize the Lucent call by call services):

- 00001 = Access to Virtual Private Network (such as Lucent's Software Defined Network service)
- 00010 = MEGACOM 800
- 00011 = MEGACOM
- 00110 = ACCUNET switched digital service
- 00111 = International long distance service
- 01000 = International 800
- 01011 = Electronic Tandem Network
- 01101 = Private Virtual Network
- 10000 = DIAL IT and Lucent MultiQuest

For each FX and TIE trunk service, a Facility Number is assigned.

The maximum number of trunks limited by each service route is entered when configuring the service routes. The maximum number of channels per service (a maximum value is required by the Bellcore Technical Reference Specification) is controlled by the Central Office, and assigned at the time of subscription. It is this value that must be entered in Overlay 16.

There is no minimum limit specified by the Bellcore Technical Reference Specification, therefore no minimum value is assigned by the Central Office, or defined on the Meridian 1.

Engineering consideration pertaining to service maximums

The maximum value of trunks defined for any service type cannot exceed the network maximum, but the total of all maximums combined may be greater than the network maximum.

For example, in a single 23B+D span, two service routes may be configured, each with a maximum of 15 trunks (B-channels). Even though the combined number of B-channels (30) is greater than the network maximum (23), a minimum of 8 B-channels would be left available for other service routes.

For an incoming call to the Meridian 1, if the maximum number of trunks defined for a service has been reached, the Meridian 1 will return a “Release Complete” message to the Central Office, with the “Cause” value set to “User Busy”. This allows the Central Office to return a busy tone to the caller.

Service routes for public network calls

NI-2 Call By Call Service Selection uses the Network Specific Facility (NSF) Information Element (IE) to indicate the requested service in the call request. If no NSF IE is included, the call is treated as a TR-1268 public network call (CO or DID).

Multiple service routes can be configured on a master route to serve outgoing public network calls, but only one service route may be specified in the master route to serve incoming public network calls (this is done using the IPUB prompt in Overlay 16). The route type for these service routes may be COT and DID. The result is that a system may be configured to handle public network calls with one incoming route and multiple outgoing routes, or one incoming and outgoing route with multiple outgoing routes.

NI-2 CBC service route treatment

Each service route stores the information, pertaining to a particular subscribed service, required to initiate or terminate a call. The information is transmitted to, or received from, the network by means of an NSF IE contained in the outgoing or incoming SETUP message.

Originating treatment (Meridian 1 to Central Office)

The Meridian 1 can designate the desired service to the Central Office, on a call-by-call basis. This is done by means of an NSF IE in the outgoing SETUP message. The NSF IE is built using the information configured in the service route. The SETUP message is sent by seizing a B-channel from a pool of channels associated to the CBC master route.

Termination treatment (Central Office to Meridian 1)

The Central Office, when offering a call to the Meridian 1 over the CBC master route, indicates in the NSF IE the type of service of the incoming call. The NSF IE contains the information required to identify a service route and to handle further call processing. The termination of NI-2 CBC service routes is based on the existing Nortel's Integrated Services Access feature (ISA) call by call service treatment, and summarized in Table 6.

Table 6
Call termination for NI-2 CBC service route

TKTP	AUTO ^a = No				AUTO = Yes	
	DNIS ^b = No		DNIS = Yes		DNIS = No	DNIS = Yes
	IDC ^c = No	IDC = Yes	IDC = No	IDC = Yes		
COT	attendant	N/A ^d	N/A	N/A	AUDN ^e	N/A
FEX	attendant	IDC digit	N/A	IDC digit	AUDN	N/A
WAT	attendant	IDC digit	N/A	IDC digit	AUDN	AUDN ^f
DID	last n CAD digit ^g	IDC digit	N/A	IDC digit	AUDN	AUDN ^h
TIE	CAD	IDC digit	N/A	IDC digit	AUDN	AUDN ⁱ

a. AUTO = Autoterminate.

b. DNIS = Direct Number Identification Service.

c. IDC = Incoming Digit Conversion.

d. N/A = Not supported.

e. AUDN = Autoterminate DN. AUDN in LD 16 has the same significance as ATDN in LD 14.

f. Must be an ACD DN.

g. Last n CAD digit = the last n digits of the Called Party Number IE, where 'n' is defined using prompt LDN0 in LD 15.

h. Must be an ACD DN.

i. Must be an ACD DN.

Differences between ISA, CBC, and NI-2 CBC

Table 7 summarizes the differences between Nortel's ISA, Lucent's Call By Call Service Selection, and NI-2 Call By Call Service Selection.

Table 7
Differences between Nortel's ISA, Lucent's CBC, and NI-2 CBC

Nortel ISA	Lucent CBC	NI-2 CBC
Proprietary (interface specific to DMS-100 and DMS-250).	Proprietary (interface specific to Lucent 5ESS Local Exchange Carriers).	Bellcore-based standard CBC service (independent of switch type).
Services: — Public — PRIVATE — INWATS — OUTWATS — TIE — FX	Services: — ACCUNET — SDN — MEGACOM — MEGACOM 800 — WATB — WATM — LDS — IWAT — 1800	Standardized Services: — TR-1268 Public (CO or DID) — FX — TIE — OUTWATS (IntraLATA, Bands, and InterLATA) — INWATS Non-standardized Services: — e.g., Lucent proprietary services, as follows: • Access to operator • Access to Exchange Carrier Services (call by call services) • Access to Virtual Private Network • MEGACOM/MEGACOM 800 • ACCUNET switched digital service • International long distance service • International 800 • Electronic Tandem Network • Private Virtual Network • DIAL IT and Lucent MultiQuest

Nortel ISA	Lucent CBC	NI-2 CBC
CBC calls are routed according to the Service Identifier in Service Parameter of the NSF IE.	CBC calls are routed according to the service specified by the Facility Coding Value in the NSF IE.	CBC calls are routed according to the service specified by the Facility Coding Value and the Service Parameter in the NSF IE.
Up to 512 service routes can be configured on the Meridian 1 (one per Service Identifier value), enabling access to 512 possible services.	Only one service route can be configured per service type on the Meridian 1, enabling access to only nine possible services. — 1 ACCUNET — 1 SDN — 1 MEGACOM — 1 MEGACOM 800 — 1 WATB — 1 WATM — 1 LDS — 1 IWAT — 1 1800	Up to 512 service routes can be configured on the Meridian 1, enabling access to a maximum of 512 possible services ^a . — Public^b (COT or DID) — 1 INWATS — OUTWATS (98 bands, 1 IntraLATA, 1 InterLATA) — Up to 512 FX or TIE (for FX and TIE, a Facility Number may be assigned in LD 16 for each service route)
The operation mode for TIE trunks is senderized (see footnote a).	N/A	The operation mode for TIE trunks may be senderized ^c or cut-through ^d (Release 23 supports senderized mode only).
The minimum and maximum function are defined on a per service route basis.	The minimum and maximum function are defined on a per service route basis.	The maximum value is defined on a per service route basis (a maximum is required by the Bellcore Specification). The maximum value is also defined by the serving Central Office. There is no minimum value allowed by the Bellcore Specification.

One Public service route (no NSF IE) can be configured for multiple incoming and outgoing trunks, with a maximum and a minimum value.	N/A	A system may be configured to handle public network calls with one incoming route and multiple outgoing routes, or one incoming and outgoing route with multiple outgoing routes. The route type for these service routes may be COT and DID.
---	-----	---

- a. The maximum cannot be greater than 512 for all call types.
- b. Multiple service routes can be configured on a master route to serve outgoing public network calls, but only one service route may be specified in the master route to serve incoming public network calls. The route type for these service routes may be COT and DID. The result is that a system may be configured to handle public network calls with one incoming route and multiple outgoing routes, or one incoming and outgoing route with multiple outgoing routes
- c. For a TIE trunk operating in senderized mode, the Central Office collects and screens the called digits before sending the digits to the Class II equipment or PBX at the end of the TIE trunk.
- d. For a TIE trunk operating in cut-through mode, the Central Office does not collect the called digits. The Class II equipment or the switch at the end of the TIE trunk are allowed to exchange inband information, such as dial tone and address information.

Operating parameters

For Release 23, NI-2 Call By Call Service Selection does not support the TIE trunk cut-through mode.

The maximum number of NI-2 Call By Call Service Selection routes that can be configured on a Meridian 1 is 512.

The maximum number of trunks per route is 254 per master route.

Feature interactions

Calling Party Privacy

The Calling Party Privacy feature allows a user the option of restricting the display of the calling number on the set of the called party. The INWATS service requires that the CLID always be displayed. Therefore, subscribers to INWATS cannot restrict the display of the calling number, even though they have the Calling Party Privacy feature active.

Feature packaging

The NI-2 Call By Call Service Selection feature requires the NI-2 Call By Call (CBC_PKG) package 334.

The following packages are also required as dependencies:

- National ISDN-2 (NI2) package 291
- Integrated Services Digital Network (ISDN) package 145
- Primary Rate Access (PRA) package 146
- Multi-purpose Serial Data Link (MSDL) package 222

Traffic measurement output

The TFC002 traffic report has been updated for NI-2 CBC as shown by **Table 8**:

Table 8
TFC002 NI-2 CBC trunks format

System ID	TFC002
Customer Number	
Route Number	Trunk Type
Trunks equipped	Trunks working
Incoming usage	Incoming peg count
Outgoing usage	Incoming peg count
Outgoing overflow	All trunks busy
Toll peg count	
Incoming CBC peg count	Outgoing CBC peg count

Trunk Type

For an NI-2 CBC master route, 'CBCT' is output in this field. For an NI-2 CBC service route, one of the following is output in the field, based on the trunk type of the route:

- FEX
- TIE
- CO

- DID
- WATS

Trunks Equipped

This field indicates the total number of trunks configured for the NI-2 CBC master route (this field would always be 0 for service routes).

Trunks Working

This field indicates the total number of trunks enabled (working) for the NI-2 CBC master route (this field would always be 0 for service routes).

Incoming usage

This field indicates the total number of incoming routes, for both the NI-2 CBC master route and service routes.

Outgoing usage

This field indicates the total number of outgoing routes, for both the NI-2 CBC master route and service routes.

Outgoing overflow

This field indicates the number of outgoing overflow routes for the NI-2 CBC master route (this field would always be 0 for service routes).

Toll peg count

This field indicates the toll peg count for the NI-2 CBC master route (this field would always be 0 for service routes).

Incoming peg count

This field indicates the incoming peg count increment when an incoming trunk call on the NI-2 CBC master route becomes idle (this field would always be 0 for service routes).

Outgoing peg count

This field indicates the outgoing peg count increment when an outgoing trunk call on the NI-2 CBC master route becomes idle (this field would always be 0 for service routes).

All Trunk Busy

This field indicates the increment when all trunks (incoming and outgoing) on the NI-2 CBC master route becomes busy. For a service route, this field indicates the increment when the number of calls (both incoming and outgoing) for the service route has reached its maximum value.

Incoming CBC peg count

This field indicates the incoming peg count for an NI-2 CBC service route.

Outgoing CBC peg count

This field indicates the outgoing peg count for an NI-2 CBC service route.

Feature implementation

To configure NI-2 CBC, the following implementation must be performed:

- Load Overlay 17 and configure the NI-2 Basic Call Service.
- Load Overlay 16 and configure a trunk route as an NI-2 Call By Call Service Selection master route.
- Load Overlay 14 and define the associated list of trunks (B-channels) that are to be shared by the NI-2 CBC service routes.
- Load Overlay 16 and define the NI-2 CBC service routes.

LD 17 – Configure the primary D-channel for the NI-2 Basic Call Service.

Prompt	Response	Description
REQ	NEW	Add new data.
TYPE	CFN	Configuration Record.
ADAN	NEW DCH xx	Add a primary D-channel where: xx = 0-63.
CTYP	MSDL	Supported only on Multi-purpose Serial Data Link (MSDL) or Downloadable D-channel cards.
...		
USR	PRI	D-channel mode.
IFC	NI2	NI-2 TR-1268 interface type.
CO_TYPE		Central Office switch type (prompted only if IFC = NI2).
	(STD)	STD = Totally compatible with Bellcore standard.
	ATT	ATT = Lucent 5ESS.
PRI	Ill nn	Ill = PRI loop using the same D-channel (0,1,...159) nn = Interface identifier (2-15)
...		

LD 16 – Configure the NI-2 Call By Call Service master route.

Prompt	Response	Description
REQ	NEW CHG	Add new data. Change existing data.
TYPE	RDB	Route Data Block.
DMOD	1-127	Default Model number for this route (Option 11)
CUST	xx	Customer number.
ROUT	0-511 0-127	Route number. For Option 11C.

TKTP	CBCT	The trunk type is a Call By Call master route.
...		
ISDN	YES	ISDN route.
- IFC	NI2	Interface type is NI-2.
- IPUB	0-511 0-127	Service route to be used for incoming network calls. For Option 11C.
...		
- - PNI	1-32700	Private Network Identifier.
...		
ICOG	IAO ICT OGT	IAO = The trunk is incoming and outgoing. ICT = The trunk is incoming only. OGT = The trunk is outgoing only.
...		

LD 14 – Define the associated list of trunks (B-channels) that are to be shared by the NI-2 CBC service routes

Prompt	Response	Description
REQ	NEW CHG	Add new data. Change existing data.
TYPE	CBCT	Call By Call trunk.
TN	l ch	Loop and channel for digital trunks, where: l = Previously defined loop number (0-159). ch = channel (1-24).
CUST	xx	Customer number.
RTMB	0-511,1-254	CBC master route and member number.
...		

LD 16 – Configure the NI-2 CBC service routes.

Note: Up to 512 service routes can be configured using this procedure.

Prompt	Response	Description
REQ	NEW CHG	Add new data. Change existing data.
TYPE	RDB	Route Data Block.
...		
TKTP	TIE COT DID WAT FEX	Service trunk type. TIE Central Office Direct Inward Dial Wide Area Telecommunications Service Foreign Exchange
...		
ISDN	YES	ISDN route.
- IFC	NI2	Interface type is NI-2.
- CBCR	YES	Service route indicator.
- - RTN	0-511 0-127	Master route number, as previously defined in LD 16, with which the service routes are associated. For Option 11 C.
- - SRVC	(0)-31	Decimal value of the service provisioned for NI-2. Prompted only if IFC = NI2. 0 = Public call service 19 = FX (Foreign Exchange) service 20 = TIE service 17 = Inward Wide Area Telecommunications Service (INWATS) service 18 = Outward Wide Area Telecommunications Service (OUTWATS) service. Lucent proprietary call by call services may also be defined here. Refer to page 336 for a list of these values.

- - FACN	(0)-99999	TIE or FX facility number. Prompted only if IFC = NI2, and SRVC = 19 (FX) or 20 (TIE).
- - BAND	(0)-99	OUTWATS band number. Prompted only if IFC= NI2 and SRVC = 18 (OUTWATS).
- - IEC	(0)-xxx (0)-xxxx	Inter-Exchange Carrier providing the service. Prompted if IFC = NI2 and SRVC = 0-16, 18, or 21-31.
- - MAX	xxx	Maximum number of trunks for the service route. This value must be the same as the value assigned by the Central Office at the time of subscription.
...		

Sample configuration

The following provides a sample configuration of the NI-2 CBC feature.

Load Overlay 17 and configure a primary D-channel for the NI-2 Basic Call Service.

Prompt	Response	Description
REQ	NEW	Add configuration information.
TYPE	CFN	Configuration Record.
ADAN	NEW DCH 1	Add a primary D-channel for NI-2, where 1 is the primary D-channel number.
CTYP	MSDL	Supported only on Multi-purpose Serial Data Link (MSDL) or Downloadable D-channel cards.
...		
USR	PRI	D-channel mode.
IFC	NI2	NI-2 TR-1268 interface type.
CO_TYPE	STD	Central Office switch type for the NI-2 interface. STD = Totally compatible with Bellcore standard.

PRI	1 2	1 = PRI loop using the same D-channel (0,1,...159) 2 = Interface identifier (2,3,...15)
...		

Load Overlay 16 and configure a trunk route as an NI-2 Call By Call Service Selection master route.

Prompt	Response	Description
REQ	CHG	Change data.
TYPE	RDB	Route Data Block.
DMOD	1-127	Default Model number for this route (Option 11)
CUST	0	Customer number.
ROUT	0	Master route number.
TKTP	CBCT	The trunk type is a Call By Call master route.
DTRK	YES	Trunk route is digital.
DGTP	PRI	Trunk type is digital.
ISDN	YES	ISDN is used.
...		
- IFC	NI2	Interface type is NI-2.
- IPUB	1	Service route for incoming public network calls.
...		
- - PNI	1	Customer's Private Network Identifier.
...		
ICOG	IAO	The trunk is incoming and outgoing.
...		

Load Overlay 14 and define the associated list of trunks (B-channels) that are to be shared by the NI-2 CBC service routes.

Prompt	Response	Description
REQ	CHG	Change data
TYPE	CBCT	Call By Call trunk.
TN	0 1	Loop and channel for digital trunks, where: 0 = Previously defined loop number (0-159). 1 = channel (1-24).
CUST	0	Customer Number.
RTMB	0 1	CBC master route and member number.
...		

Load Overlay 16 and define the NI-2 CBC service routes. Up to 512 service routes can be configured using this procedure.

Prompt	Response	Description
REQ	NEW,CHG	Add or change data.
TYPE	RDB	Route Data Block.
CUST	0	Customer number.
ROUT	1	Service route number.
...		
TKTP	TIE	Service trunk type.
...		
ISDN	YES	ISDN route.
- IFC	NI2	Interface type is NI-2.
- CBCR	YES	Service route indicator.
- - RTN	0	Master route number, as previously defined in LD 16, with which the service routes are associated.

-- SRVC	20	Decimal value of for TIE service.
-- FACN	20	TIE Facility Number.
-- MAX	1	Maximum number of trunks for the service route. This value must be the same as the value assigned by the Central Office at the time of subscription.
...		

Feature operation

No specific operating procedures are required to use this feature.

Feature testing

Test each PRI trunk to ensure that the Meridian 1 completes an NI-2 CBC call. Run the following test for each of the available call types: TIE, Public (COT, DID), FX, INWATS, and OUTWATS.

To test NI-2 CBC, follow steps 1 through 8.

- 1 Select a PRI to be tested.
- 2 Access LD 60. Use STAT command on all pertinent B-channels.
- 3 Set all the Maximum value in all service routes to 1 (the Central Office must define the same value, that is, 1).
- 4 Make a test call on a trunk route that accesses the PRI being tested. Be sure the test call is to a valid destination.
- 5 Use LD 80 to ensure a B-channel from the NI-2 CBC pool is in use. Then:
 - Place the call on hold.
 - Make another call. You should receive an overflow signal (fast busy).
 - Repeat this procedure for every outgoing service route.
- 6 Disconnect both calls.

- 7** Ask the terminating end to place an incoming call for each incoming call type, then:
- Place the call on hold.
 - Ask the terminating end to place another call. They should receive an overflow signal (fast busy).
 - Disconnect both calls.

Non-Associated Signaling Channels (nB+D)

On an Option 11 system, the D-Channel can support up to 8 PRIs in an nB+D environment with a minimum of 23 and a maximum of 190 B-channels. The 190 B-channel restriction is derived from the calculation of 8 PRIs x 24 B-channels minus 2 D-Channels.

An nB+D arrangement allows a PRI facility to consist of 24 B-channels, while the D-Channel is carried by, and shared with, another PRI link.

Package Requirements

Package requirements are as follows:

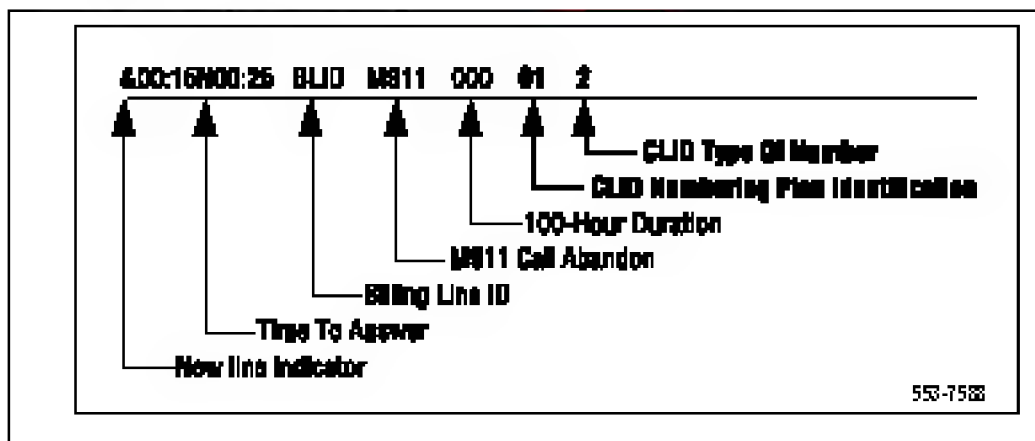
ISDN	option 145
PRI or ISL	option 146 (PRI) or option 147 (ISL)

NPI and TON in CDR Tickets

The Numbering Plan Identification (NPI) and Type Of Number (TON) in Call Detail Recording (CDR) Tickets¹ feature allows NPI and TON information to be optionally displayed on the third line of CDR tickets. NPI and TON are associated with Calling Line Identification (CLID) information, and are useful for billing incoming calls to the originating party.

The NPI and TON are only displayed for calls on an incoming ISDN trunk. Also, the New Format CDR (FCDR) prompt must be set to NEW and the Calling Line Identification (CLID) prompt must be set to YES in Overlay 17. Figure 12 illustrates the format of the third line of a CDR ticket.

Figure 12
Third line format for CDR ticket



1. "Ticket" is the international term for record.

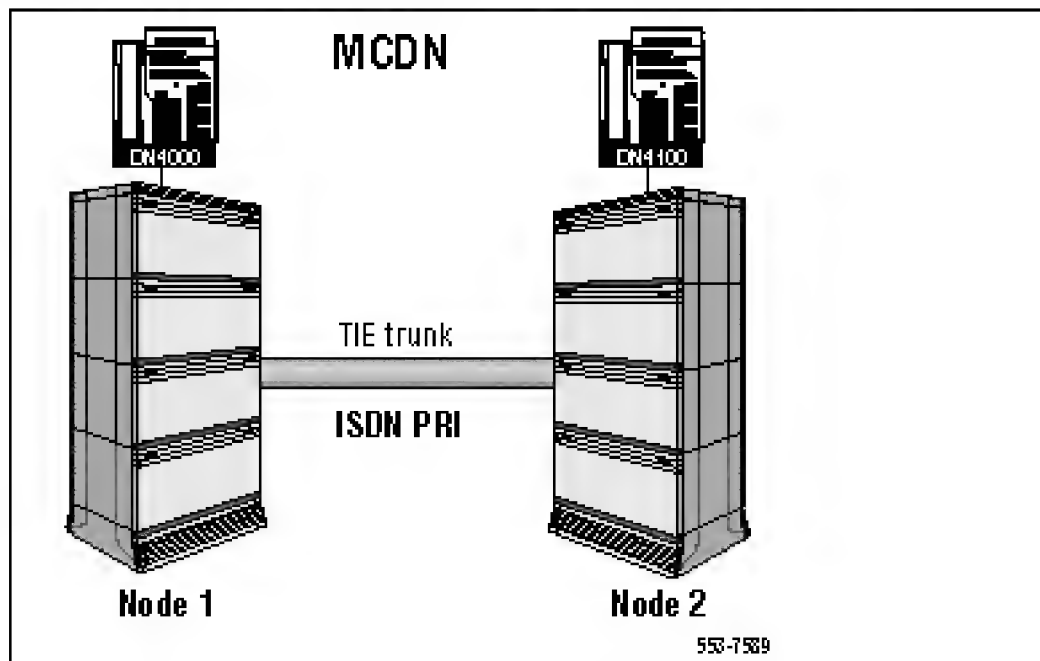
Table 9 describes the contents of the third line of CDR tickets.

Table 9
Third line contents of CDR tickets

Line	Position	Field	Field Definition
3	1	blank	
3	2	&	New line indicator
3	3-7	TTA	Time To Answer (Total ringing time)
3	8	REDIR/B	Time To Answer (Redirection Indicator)/Busy Tone Identifier
3	9-13	TWT	Time To Answer (Total Waiting Time)
3	14	blank	
3	15-30	BLID...xxx	Billing Line ID
3	31	blank	
3	32-38	ABANDON	M911 Call Abandon Tag
3	39	blank	
3	40-42	000	100-Hour Duration
3	43	blank	
3	44-45	NPI	CLID Numbering Plan Identification
3	46	blank	
3	47	TON	CLID Type Of Number
3	48	blank	

Figure 13 illustrates a scenario in which DN 4000 (on Node 1) places a call to DN 4100 (on Node 2) over a Meridian Customer Defined Network (MCDN), using a Coordinated Dialing Plan (CDP) Distant Steering Code (DSC). The call arrives at Node 2 on Route 201 Member 4. A CDR N ticket is produced when the call is disconnected.

Figure 13
Scenario involving a call over a Meridian Customer Defined Network



The CDR N ticket produced in the above scenario has the following format:

```
N 001 02 T201004 DN4100 02/10 18:07:15:00:02:24.0
& 4000XXXXXXXXXXXXX
&00:15N00:25 BLIDXXXXXXXXXXXXX          000 09 6
```


On line 3 of the ticket, the NPI value of “09” represents a private numbering plan. The TON value of “6” represents an Electronic Switched Network (ESN) Customer Dialing Plan (CDP). Please refer to **Tables 10 and 11** for the NPI and TON information for an MCDN incoming trunk.

When an incoming call arrives on the Meridian 1, NPI and TON are sent in the calling party Information Element (IE) and are mapped into internal values. The correspondence between the Meridian 1 values and the values given in the specifications are described in **Tables 10 to 17**.

Tables 10 to 17 show the information printed in the CDR ticket, depending on the incoming trunk protocol. As shown in these tables, not all combinations of NPI and TON exist.

In the TON tables, only ISDN/Telephony numbering plan (Rec. E.164/E.163) and private numbering plans are detailed. For all other supported NPI values, TON has the value of “unknown number”.

Referring to the scenario in **Figure 13**, **Tables 10 and 11** show the NPI and TON information for an MCDN incoming trunk.

Table 10
NPI information printed in the CDR ticket for an MCDN incoming trunk

NPI code in CDR	Corresponding value of NPI in specification
00	000 - unknown numbering plan
01	0001 - ISDN/Telephony numbering plan (Rec. E.164)
02	not used
03	not used
04	not used
08	not used
09	1001 - private numbering plan

Table 11
TON information printed in the CDR ticket for an MCDN incoming trunk

TON code in CDR	Corresponding value of TON in specification	
	NPI = ISDN/Telephony numbering plan (Rec. E.164)	NPI = private numbering plan
0	0000 - unknown number	0000 - unknown number
1	0001 - international number	not used
2	0010 - national number	not used
3	not used	0011 - ESN SPN
4	0100 - local number	not used
5	not used	0101 - ESN LOC
6	not used	0110 - ESN CDP

Tables 12 and 13 show the NPI and TON information for a QSIG incoming trunk.

Table 12
NPI information printed in the CDR ticket for a QSIG incoming trunk

NPI code in CDR	Corresponding value of NPI in specification
00	0000 - unknown
01	0001 - ISDN/Telephony numbering plan (Rec.E.164/E.163)
02	not used
03	0011 - data numbering plan (Rec.X.121)
04	0100 - telex numbering plan (Rec. F.69)
08	1000 - national standard numbering plan
09	1001 - private numbering plan

Note: QSIG refers to ISO QSIG and ETSI QSIG.

Table 13
TON information printed in the CDR ticket for a QSIG incoming trunk

TON code in CDR	Corresponding value of TON in specification	
	NPI = ISDN/Telephony numbering plan (Rec. E.164)	NPI = private numbering plan
0	000 - unknown or 110 - abbreviated number	000 - unknown or 110 - abbreviated number or 001 - level 2 regional number or 101 - level3 regional number
1	001 - international number	cannot be mapped
2	010 - national number	010 - level 1 regional number
3	011 - network specific number	011 - PTN specific number
4	100 - subscriber number	100 - local number
5	not used	cannot be mapped
6	cannot be mapped	cannot be mapped

Note: QSIG refers to ISO QSIG and ETSI QSIG.

Tables 14 and 15 show the NPI and TON information for a non-UIPE and non-MCDN incoming trunk.

Table 14
NPI information printed in the CDR ticket for a non-UIPE and non-MCDN incoming trunk

NPI code in CDR	Corresponding value of NPI in specification
00	0000 - unknown numbering plan
01	0001 - Rec. E.164
02	0010 - Rec. E.163
03	0011 - Rec. X.121
04	0100 - Telex numbering plan
08	1000 - national numbering plan
09	1001 - private numbering plan

Note: Non-UIPE refers to the 1TR6, AXE-10 for Australia and Sweden, Swissnet 2, Numeris VN4, SYS-12, and D70 connectivities. These interfaces are not supported in North America.

Table 15
TON information printed in the CDR ticket for a non-UIPE and non-MCDN incoming trunk

TON code in CDR	Corresponding value of TON in specification	
	NPI = ISDN/Telephony numbering plan (Rec. E.164)	NPI = private numbering plan
0	0000 - unknown number ¹	0000 - unknown number ¹
1	0001 - international number ²	not used
2	0010 - national number ²	not used
3	not used	0011 - network specific number ²
4	0100 - subscriber number ²	not used
5	not used	not used
6	not used	0110 - abbreviated number ²

1. For SYS-12, AXE-10 for Australia and Sweden, Swissnet, Numeris VN4, and D70 interfaces, all received values are mapped into unknown code. These interfaces are not supported in North America.

2. For all interfaces not mentioned in 1.

Tables 16 and 17 show the NPI and TON information for an NI-2 incoming trunk.

Table 16
NPI information printed in the CDR ticket for an NI-2 incoming trunk

NPI code in CDR	Corresponding value of NPI in specification
00	0000 - unknown numbering plan
01	0001 - ISDN/Telephony numbering plan (Rec. E.164)
02	unused
03	unused
04	unused
08	unused
09	1001 - private numbering plan

Table 17
TON information printed in the CDR ticket for an NI-2 incoming trunk

TON code in CDR	Corresponding value of TON in specification	
	NPI = ISDN/Telephony numbering plan (Rec. E.164)	NPI = private numbering plan
0	not used	not used
1	001 - international number	not used
2	010 - national number	not used
3	not used	not used
4	100 - local number	100 - subscriber number
5	not used	not used
6	not used	not used

Operating parameters

The NPI and TON in CDR Tickets feature applies only for incoming ISDN trunk calls. NPI and TON information depends on the incoming trunk protocol.

The NPI and TON fields are left blank for internal calls, outgoing trunks, incoming non-ISDN trunks, or if the CLID prompt is set to NO.

When the FCDR prompt is set to OLD, the NPI and TON fields do not exist, regardless of how the CLID prompt is defined.

NPI and TON information is available with the following incoming interfaces: QSIG (ISO), MCDN, non-UIPE and non-MCDN, and NI2.

NPI and TON information is included in all types of CDR records that contain CLID information.

NPI and TON information is lost when system initialization occurs and the call is then reconstructed. In this case, if the call involves an incoming ISDN trunk and if the NPI and TON in CDR Tickets feature is configured, the NPI field contains two zeros (00) and the TON field contains one zero (0), regardless of the NPI and TON sent at call setup.

Feature interactions

The NPI and TON in CDR Tickets feature does not have any specific interactions with other features.

Feature packaging

The NPI and TON in CDR Tickets feature requires the following packages:

- Call Detail Recording (CDR) package 4
- Call Detail Recording on Teletype Machine (CTY) package 5
- New Format Call Detail Recording (FCDR) package 234
- Calling Line Identification in Call Detail Recording (CCDR) package 118

Feature implementation**LD 17** – Configure the NPI and TON fields.

Prompt	Response	Description
REQ	CHG	Change existing data.
TYPE	PARM	System parameters.
...		
FCDR	NEW	New Format CDR. OLD = Old CDR format (default).
...		
CLID	YES	TON and NPI fields, in addition to CLID, are included.
...		

Note 1: For the NPI and TON in CDR Tickets feature, existing CDR implementation procedures must be performed.

Note 2: CLID must be configured for the NPI and TON in CDR Tickets feature. Refer to the “Calling Line Identification” and “ISDN Calling Line Identification Enhancements” feature modules in this document.

Feature operation

No specific operating procedures are required to use this feature.

Primary Rate Access Package

This package allows for the configuration of PRI in a 23B+D, nB+D, or ISL shared mode arrangement. It also allows for the transport of CLID and ESN/ISDN features.

Package Requirements

Package requirements are as follows:

PBXI	option 75
ISDN	option 145

Remote Virtual Queuing

Remote Virtual Queuing (RVQ) allows you to perform queuing type functions on a trunk (B-Channel) in your ISDN network. This feature is similar to the ESN features Coordinated Call-Back Queuing (CCBQ), and Call-Back Queuing to a Conventional Main (CBQCM). Prior to operating RVQ, you must have a working knowledge of the ESN features. Refer to *Electronic Switched Network description* (309-3001-100) for a complete description of these features.

Remote Virtual Queuing (RVQ) is supported on a private ISDN PRI/ISL network only.

When an outgoing network path is unavailable, Remote Virtual Queuing (RVQ) provides call back queuing. RVQ scans ahead on the ISDN trunk to be sure the entire path from origination to termination is available. When a path becomes idle, you are notified and can ring the path again to terminate the call.

Operating parameters

In addition to the function offered by CCBQ and CBQCM, RVQ provides the following:

- There is no limit to the number of nodes in the ISDN network that RVQ searches.
- The originating node has control of the call.

RVQ is supported in a private ISDN PRI/ISL network only. Any trunk other than an ISDN PRI or ISL trunk is considered a Non-RVQ Compatible (NRC) trunk. NRC trunks include analog trunks, T1 trunks, or public trunks. NRC also includes trunks connecting to a non-Meridian 1, non-ISDN, or Pre-Release 18 node.

The originating, tandem, and terminating nodes must run X11 release 18 or later software, and include all the required packages (refer to Feature packaging in this module).

Meridian Modular, 500/2500, SL-1, and Meridian digital telephones can activate and receive RVQ calls. Data terminals are also supported. Attendants cannot activate RVQ.

RVQ is activated only by telephones with Ring Again allowed.

AUTHCODE is supported on the first tandem node only.

The RVQ retry timer is set for each NCOS. Setting a specific NCOS with a low retry timer searches for more connections more often. The lower the timer, the greater the chance to connect the call.

Trunk Access codes are not supported.

ACD DN's are supported as a terminating DN.

Attendants are supported as terminating stations.

The maximum total amount of time RVQ searches for available paths is 30 minutes. The countdown begins as soon as the originator activates the Ring Again key.

Only one RVQ Ring Again attempt at a time is allowed. If Ring Again is pressed again, after activating it for RVQ, the most recent number dialed is the one attempted.

RVQ does not check the terminating telephone's status. The dialed DN may be invalid or busy. Once the path is available, the RVQ call can reach the dialed DN. It is possible the dialed telephone is busy, and Network Ring Again may be used if enabled. The tone indicating the trunks are busy is a fast busy tone. A busy DN is indicated by a standard busy tone.

RVQ searches throughout Meridian 1 networks only. Off-net trunk paths cannot be checked beyond the first trunk.

RVQ is a virtual queuing feature. Each RVQ call is independent of another. It does not operate by first in first out policy. The first caller to initiate RVQ is not necessarily the first person connected.

It may take up to 30 seconds for notification to reach the originator. The network path is reserved while RVQ notifies the caller. In a private network, the path is reserved from the originating node to the terminating node. Otherwise the path is reserved up to the first NRC trunk.

RVQ supports Uniform Dialing Plan (UDP), and Coordinated Dialing Plan (CDP). For NRC trunks, the E.164 public numbering plan is supported.

The following lists the trunk types RVQ supports.

— Private network ISDN trunks:

TIE

COT

Direct Outgoing Dial (DOD):

WATS

ISA

FEX

— NRC trunks:

COT

Direct Outgoing Dial (DOD):

WATS

FEX

ISA

TIE

RVQ supports Meridian 1 machines only, in a private ISDN PRI/ISL network. If tandeming to a non-Meridian 1 machine, it is treated as a Non-RVQ Compatible (NRC) trunk.

RVQ is canceled if the originating node system initializes.

If the originating node performs a cold start, RVQ is canceled.

RVQ from a Conventional Main (RVQCM) requires a special configuration.

With RVQ, callers cannot activate Ring Again to refuse expensive routes after the Expensive Route Warning Tone (ERWT) is given.

When using RVQ from a Conventional Main (RVQCM), the originating node seizes the same TIE trunk group that was used to initiate RVQCM for the callback. Thus, these trunk groups must be two-way (incoming/outgoing) and configured for far end disconnect.

Conventional mains must provide answer supervision on TIE trunks connected to the originating node. The system must also permit transmission or repetition of telephone dial pulses for RVQCM operation. This feature cannot be used with systems that operate in senderized mode. Operation may require adjustment of the interdigit timeout on systems that employ simulated cut-through operation.

Multiple callback queues are allowed per trunk group for the Conventional main by dialing any digits (up to 7) based on the availability of Meridian 1 call registers.

When utilizing RVQCM, do not call forward the calling telephone when awaiting callback. If the telephone is forwarded, it is possible that the TIE trunk will not be released at the end of the call.

Feature interaction

Drop Back Busy

Drop Back Busy (DBB) and Remote Virtual Queuing (RVQ) are both packaged under the Originating Routing Control/Remote Virtual Queuing (ORC-RVQ) package 192. If RVQ and DBB are both configured, DBB will take precedence over RVQ. If the user wishes to activate RVQ, DBB must be disabled for a route entry in response to the IDBB prompt. If the user wishes to activate DBB, it must be enabled by entering DBI or DBA. Refer to the “Implementation” section for more information.

Coordinated Call-Back Queueing

CCBQ and RVQ can both be enabled on a single machine.

Call-Back Queueing to a Conventional Main

CBQCM and RVQ can both be enabled on a single machine.

Direct Inward System Access

DISA DN's are not supported by RVQ.

Make Set Busy

RVQ can be originated by, and terminated on an ACD DN in Make Set Busy mode.

Network ACD

If a target agent is available on a remote node, RVQ cannot be activated if the busy trunk is found on its way to the target node.

Network Call Redirection

RVQ does not guarantee connection if the terminating telephone call forwards to a telephone on another node. When a terminating telephone call forwards to another node, that node is a redirected node. RVQ cannot search between terminating and redirected nodes.

Network Ring Again

Network Ring Again (NRAG) is activated only when the terminating telephone or console is busy. If both the network path and the terminating telephone are busy, RVQ is activated first. When the path is available, but the telephone is busy, then NRAG can be activated.

Off Hook Queueing

RVQ and Off Hook Queueing (OHQ) are compatible in a system. If OHQ is configured, it is implemented by leaving the handset off hook. RVQ is implemented by pressing the Ring Again key. Choosing one or the other method activates the specified feature.

Feature operation

RVQ supports private ISDN PRI/ISL networks, non-RVQ compatible (NRC) blocked trunks, and conventional mains (RVQCM).

RVQ on a private network. RVQ is supported for Meridian 1 machines, running X11 release 18 on an ISDN PRI/ISL network only. When a blocked network path is discovered, RVQ searches through the network to ensure the entire path will be clear when the blocked section is cleared. When all trunks along the path are available, RVQ notifies you.

When a trunk is busy, RVQ follows this checklist before invoking RVQ.

- The first tandem node must be a Meridian 1 node, running X11 release 18 or later software.
- The originating node's Network Class of Service (NCOS) must allow Call Back Queueing (CBQ).

- At least one route in the initial set of the route list must allow CBQ.
- The system has CBQ allowed at the Network Control Block.

When the checks are complete, activate RVQ by pressing the Ring Again key. As soon as the key is pressed, the retry timer begins. When the retry timer expires, RVQ checks the path again. The total amount of time RVQ will spend on a search is 30 minutes.

The retry counter controls the number of times the initial set is checked before RVQ searches the extended set. The extended set search includes all the trunks in both the initial and extended sets.

Tandem nodes must recognize the RVQ messages and pass them on to another tandem or terminating node.

RVQ with NRC trunks. RVQ searches the path until it reaches the first Non-RVQ Compatible (NRC) trunk. RVQ notifies the originator when that trunk is available, but cannot search beyond it. It is possible that the path may be blocked beyond the NRC trunk, and the call cannot go through.

Any trunk other than an ISDN PRI or ISL trunk is considered an NRC trunk. NRC trunks include analog, T1, or public trunks, as well as trunks connecting to a non-Meridian 1, non-ISDN, or non-X11 release 18 node.

When an NRC trunk is busy, RVQ follows this checklist before implementing RVQ.

- First tandem node must be a Meridian 1 node, with X11 release 18 or later.
- Originating node's NCOS must allow Call Back Queuing (CBQ).
- At least one route in the initial set of the route list must allow CBQ.
- The system has CBQ allowed at the Network Control Block.

When the checks are complete, activate RVQ by pressing the Ring Again key. As soon as the key is pressed, the retry timer begins. When the retry timer expires, RVQ checks the path again. The total amount of time RVQ will spend on a search is 30 minutes.

The retry counter controls the number of times the initial set is checked before RVQ searches the extended set. The extended set search includes all the trunks in both the initial and extended sets. Only the first NRC trunk is checked. RVQ cannot search beyond that trunk, even if the subsequent trunks are ISDN PRI/ISL.

RVQ on a conventional main (RVQCM). A conventional main call is one that comes from a non-Meridian 1 system into the private network through a TIE trunk to a Meridian 1 node. When the conventional main call enters the network, the default NCOS is assigned to the TIE trunk to determine RVQCM eligibility. Use Authcode last to upgrade the NCOS if necessary.

When a conventional main call is blocked, RVQ checks the following at the first Meridian 1 node to ensure RVQCM can be activated. The Meridian 1 node is considered the Originating node, and controls the call.

- The tandem and terminating nodes must be Meridian 1 nodes, running X11 release 18 or later software.
- The originating node's Network Class of Service (NCOS) must allow Call Back Queuing (CBQ).
- At least one route in the initial set of the route list must allow CBQ.
- The system has CBQ allowed at the Network Control Block.
- The incoming TIE trunk allows CBQ.

RVQCM is offered to the conventional main caller with a special offer tone (3 beeps). To accept RVQ, enter the calling number. After the same special confirmation tone (3 beeps) is heard, hang up. The originating node begins the retry timer and search process. When the retry timer expires, RVQ checks the path again. The maximum total amount of time RVQ will spend on a search is 30 minutes. When the path is free, the originating node calls the caller back (at the number entered). The phone rings, the same special callback tone (3 beeps) is heard, and the call is connected. RVQCM cannot be canceled from the conventional main once started.

If the calling telephone is busy, or does not answer the callback, the RVQ callback is placed in a 5 minute suspense state. After 5 minutes have passed, RVQ attempts the callback again. If the calling telephone is still busy, or does not answer, RVQ is canceled.

The retry counter controls the number of times the initial set is checked before RVQ searches the extended set. The extended set search includes all the trunks in both the initial and extended sets.

Note: The calling number is accepted only if the database has been configured to accept the given number of digits. If not, or if the caller does not hang up, overflow tone is given, and the call is disconnected. RVQCM does not verify that the dialed DN is valid or free.

Once started, RVQ cannot be canceled from the convention main. Operating parameters relating to Call Back Queuing for Conventional Mains (CBQCM) also apply to RVQCM as follows. Refer to the *ESN description* (309-3001-100) for complete discussions of CBQCM.

Users at Conventional Mains cannot activate Ring Again to refuse expensive routes after the Expensive Route Warning Tone (ERWT) is given.

The node seizes the same tie trunk group that was used to initiate RVQCM for the callback. These trunk groups must be two way (incoming/outgoing).

Conventional Mains must provide answer supervision on tie trunks connected to the node. These switches must also permit transmission, or repetition of telephone dial pulses for RVQCM operation. This feature cannot be used with systems that operate in senderized mode. Operation may require adjustment of the interdigit timeout on systems that employ simulated cut-through operation.

Multiple callback queues are allowed per trunk group for the Conventional Main by dialing up to 7 digits (any digits are allowed) based on the availability of Meridian 1 call registers.

CAUTION

Conventional Mains must not allow RVQCM callback calls to be modified by call transfer or call forward to an outside line. Call modifications like this can result in the tie trunk not being released at the end of the call.

Operating RVQ from a digital telephone. The following lists the steps required to activate RVQ from any Meridian digital, Meridian Modular, or SL-1 telephone.

- 1 Place a call to a DN on another node.
- 2 Hear overflow tone indicating a busy trunk along the call path.
- 3 Press the Ring Again (RGA) key. The RGA lamp lights, and the tone stops. If the lamp remains dark, RVQ may not apply.
- 4 Go on-hook.
- 5 The RGA lamp fast flashes, and a 1 second buzz indicates the path is available. If you are on another call, you hear the Ring Again tone.
- 6 Go off-hook (or press a DN key), and press the RGA key to connect the call. If the RVQ notice is not answered within 16 seconds, the RVQ notice stops, and the request is canceled.
- 7 If the terminating telephone is busy, you hear regular busy tone. You may activate Network Ring Again (NRAG) at this point.

Cancel the RVQ request at any time by pressing the RGA key. The associated lamp goes dark.

Operating RVQ from a 500/2500 telephone. The following lists the steps required to activate RVQ from any 500/2500 telephone.

- 1 Place call to a DN on another node.
- 2 Hear overflow tone indicating a busy trunk along the call path.

- 3 Switchhook flash, and hear special tone (3 beeps).
- 4 Dial the Ring Again SPRE or FFC, and hear confirmation tone. If RVQ is not enabled, intercept treatment is given.
- 5 Go on-hook.
The RVQ search takes place only when the telephone is idle. RVQ searches only while you are off-hook. However, the timer runs while you are on-hook, or off-hook.
- 6 Special ringing cadence indicates the path is available.
- 7 Go off-hook to connect the call.
If the RVQ notice is not answered within 16 seconds, the RVQ notice stops, and the request is canceled.

Cancel the RVQ request at any time by going off hook and entering the Ring Again deactivation SPRE or FFC.

Operating RVQCM from conventional main telephone. The following lists the steps required to activate RVQCM from a conventional main telephone.

- 1 Place call to a DN on a Meridian 1 node.
- 2 Hear special dial tone (3 beeps), or RAN if configured, indicating a busy trunk along the call path.
- 3 Dial the calling DN, and hear the same special tone (3 beeps).
- 4 Go on-hook.
- 5 The phone rings when the originating node calls back.
- 6 Go off-hook, hear the same special tone (3 beeps). Stay off-hook, and the call is connected. If the RVQ notice is not answered within the time set in LD 87 (CBTL prompt), the RVQ notice stops, and the request is canceled.

RVQ cannot be canceled from a conventional main telephone, but may timeout after 20 seconds

If the calling telephone is busy, or does not answer the callback, the RVQ callback is placed in a 5 minute suspense state. After 5 minutes have passed, RVQ attempts the callback again. If the calling telephone is still busy, or does not answer, RVQ is canceled.

Package Requirements

- Originating Routing Control/Remote Virtual Queuing (ORC-RVQ) package 192, requiring:
 - Network Signaling (NSIG) package 37
 - Network Call Back Queuing (MCBQ) package 38
- ISDN Supplementary (ISDNS) package 161
- Main Network Queuing package 38
- Flexible Call Back Queuing package 61
- Digital Trunk Interface package 75
- ISDN signalling package 145
- ISDN PRI package 146 or ISL package 147
- Advanced Network Services package 148 (for NRAG capability)

T309 Timer

The T309 timer provides a 90-second wait interval after a D-channel failure before the B-channels are cleared. When the D-channel is re-established before T309 expires, a STATUS ENquiry message is sent by the network side. The user side responds with a STATUS message to report the status of the queried channel. If the call state matches, the call is preserved; otherwise, a RElease message is sent to the user side, clearing the call. If the user side does not respond with the STATUS message before the T322 timer expires, the call is cleared.

If T309 expires before the D-channel is re-established, indicating that there is a serious problem with the link, Meridian 1 clears all calls internally and sends a global RESTART when the D-channel is re-established.

For a Meridian 1 to Meridian 1 interface, the T309 timer is not used. The Meridian 1 keeps active calls established as long as possible and lets B-channel users decide when a call is to be dropped. The Meridian 1 specified as network side sends the STATUS ENquiry message on all active calls when the D-channel is re-established.

Prior to X11 release 18, the Meridian 1 does not support the T309 and sending the STATUS ENquiry message for North American interfaces. All active calls are cleared with a global RESTART whenever a D-channel is re-established.

The compatibility checking by means of the STATUS ENquiry message might leave some channels with mismatched states, which are cleared only when trying to reuse the channel.

T309 is dependent on both network and user sides. If a side does not have a Timer T309, it sends a global RESTART when D-channel is re-established.

AT&T 4ESS and 5ESS do not clear transient calls when the D-channel fails. If T309 expires, the calls are not cleared until the D-channel is re-established or the call is cleared by the far end.

Integrated Services Access—Integrated Services Access (ISA) tracks the number of active calls. Prior to X11 release 18, the counter for active calls is reset when the D-channel comes back. With the implementation of T309, active calls are preserved if the ninety seconds does not expire; the counter for active calls is not reset since active calls need to be tracked during the D-channel failure and reset.

Feature packaging

The T309 and STATUS ENquiry message are included in basic ISDN PRI/ISL functionality. No additional packages are required.

The T309 timer is preset at 90 seconds and cannot be service changed.

Trunk Anti-Tromboning

The purpose of the Trunk Anti-Tromboning (TAT) feature is to optimize tromboned ISDN PRI trunks, ISDN Signaling Link (ISL), Virtual Network Services (VNS) trunks, or analog trunks within an ISDN PRI network. Anti-tromboning will be performed only after the third party answers, and provided that the tromboned PRI/ISL/VNS or analog trunks are associated with the same primary D-channel (with or without a backup D-channel) and the trunks are associated with the same customer. Anti-tromboning will not be performed if the tromboning trunks belong to different customers on the same node (even though they are associated with the same primary D-channel.)

Note: TAT also applies to a call entering a Meridian 1 network over a Central Office trunk. TAT eliminates the tromboning of private network trunks that may occur if the call is redirected or modified.

The term tromboning is used to define a situation whereby two PRI/ISL/VNS trunks, associated with the same D-channel, are being used in parallel. Basically, one PRI/ISL/VNS or analog trunk (B-channel) is established to handle an incoming call from a calling set at the originating node to a called set at the terminating node. A second PRI/ISL/VNS trunk or analog (B-channel) is then established to handle the loop-back of the same call that is redirected from the called station back to a different set at the originating node.

The loop back may result from a call being treated by Network Message Services - Meridian Mail, Network Call Redirection (such as Network Call Forward All Calls, Network Call Forward No Answer, Network Call Forward Busy, and Network Hunting), or by Call Modification (such as a call transfer.) These tromboned trunks are redundant. The Trunk Anti-Tromboning (TAT) feature eliminates these redundant trunks after the call is answered. Refer to [“Example of an anti-tromboning operation” on page 378](#) for a basic example of how TAT is applied.

TAT may function with a Meridian 1 interworking with another Meridian 1, or Meridian 1 interworking with a DMS-250. In the first case, each Meridian 1 must be equipped with TAT. In the latter case, the DMS-250 must be a Sprint load equipped with the MCDN Release Link Trunk (RLT) feature. In the case of a Meridian 1 to DMS interworking, the trunks may be PRI or VNS.

TAT and Trunk Optimization Before Answer (TRO-BA) may be configured on the same system. In this case, TRO-BA would attempt to optimize the trunks before a call is connected, and TAT would then attempt to optimize the trunks after the call is connected. Please refer to the “Trunk Anti-Tromboning and Trunk Optimization - Before Answer both equipped on the same Meridian 1” on page 390 for more information and examples.

Example of an anti-tromboning operation

The following example may be used as a basic demonstration of TAT at work within a simple Meridian 1 to Meridian 1 interworking (other interworking scenarios are described in the section Anti-tromboning scenarios beginning on page 381).

In Figure 16, the following situation exists:

- Station B at the terminating node receives an incoming call over a PRI trunk from Station A at the originating node; or, an incoming CO call is tandemed from the originating node to the terminating node;
- Station B answers the call, and activates Call Transfer to Station C residing at the originating node. A second PRI trunk is established to handle the new call;
- Station B completes the call transfer, leaving Station A connected to Station C (which is in ringing state) using the two PRI trunks. The PRI trunks remain tromboned until Station C answers the call.

Figure 16
Before Trunk Anti-Tromboning operation

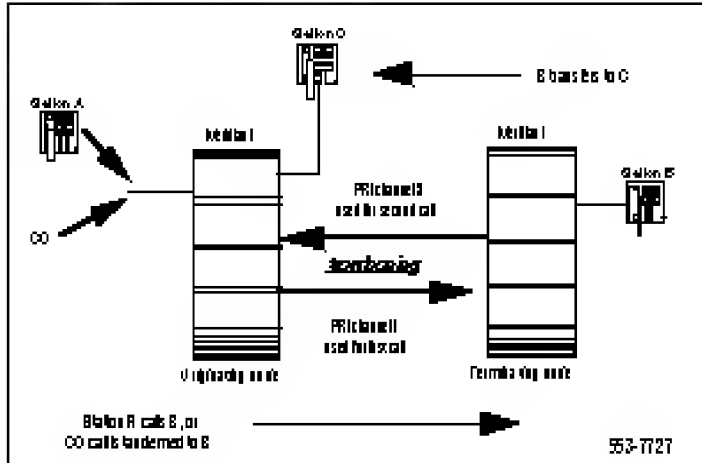
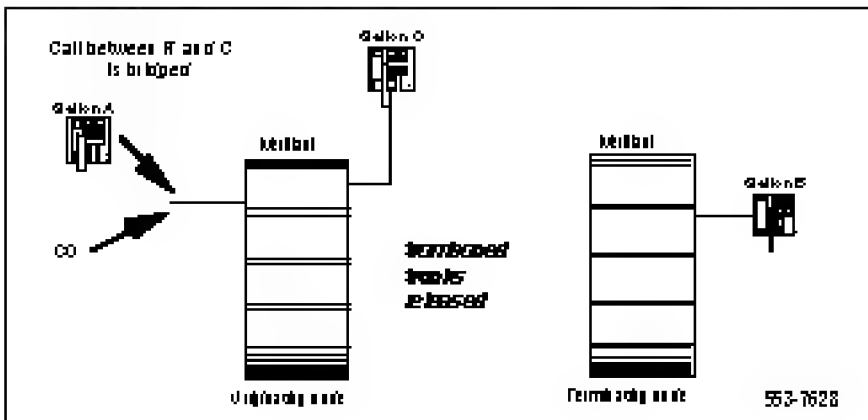


Figure 17 illustrates how the application of TAT eliminates the redundant ISDN PRI B-channels forming the loop-back. After Station C answers the call, Station A and Station C are bridged at the originating node and the redundant trunks are released, provided the trunks involved are associated with the same primary D-channel, and the same customer. This operation eliminates the use of extra network trunking facilities for the duration of the call.

Figure 17
After Trunk Anti-Tromboning operation



Note: If the TAT feature is not supported by either the originating or terminating node, or if the originating node is unable to bridge the call between Station A and Station C, then Station A and Station C remain connected via the tromboned trunks, for the duration of the call. Also, TAT would not release the tromboning trunks if Station A and Station C are both attendants.

Anti-tromboning scenarios

This section provides examples of various anti-tromboning scenarios, as applied with the Meridian 1 interworking with another Meridian 1, and a Meridian 1 interworking with a DMS-250 Sprint load equipped with RLT.

Please note that the following legend is used when showing connectivity in the illustrations.

Legend

———— PRI B-channel, or
ISL or VNS trunk

M1 = Meridian 1 switch equipped with TAT

DMS = DMS-250 Sprint load equipped with RLT

Note: In the examples that follow, the Trunk Optimization Before Answer (TRO-BA) feature is not equipped.

Anti-tromboning operation for Network Call Redirection (case 1), Meridian 1 interworking with DMS

In [Figure 18](#), the following case is represented for TAT as applied to a Network Call Redirection scenario (in the example, a case of a call forward is used), with two Meridian 1 switches interworking with a DMS-250.

- Station A located at an originating switch (Public Central Office or PBX) DMS node, makes an internodal call through a DMS-250 and a tandem Meridian 1 node to Station B located at a terminating Meridian 1 node (first call);
- Station B, located at the terminating Meridian 1 node, is call forwarded through the tandem Meridian 1 node and the DMS-250, to Station C located at the originating switch (redirected call);
- Station C answers;
- Station A connects to Station C.

Figure 18
Anti-tromboning for Network Call Redirection (case 1), M1/DMS

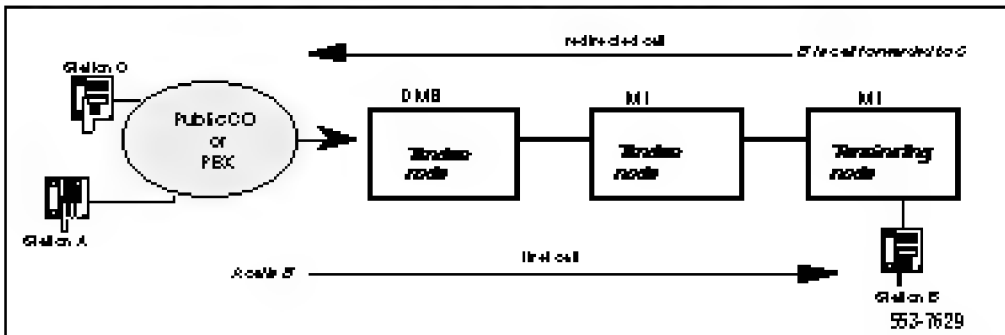
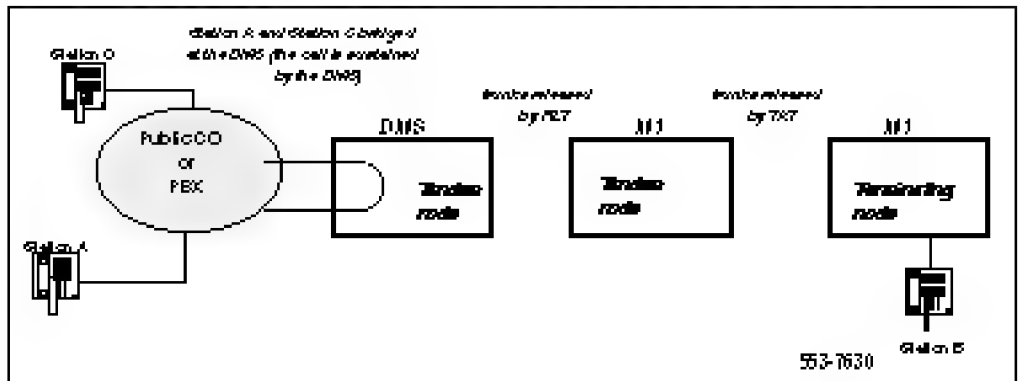


Figure 19 shows the results of anti-tromboning, after Station C answers the call.

- The call is bridged at the DMS tandem node, between A and C;
- The trunks between the terminating Meridian 1 and the tandem Meridian 1 are released by TAT;
- The trunks between the tandem Meridian 1 and the DMS are released by the RLT feature.

Figure 19
Results of anti-tromboning for Network Call Redirection (case 1), M1/DMS



Anti-tromboning operation for Network Call Redirection (case 2), Meridian 1 interworking with DMS

In [Figure 20](#), another example is presented where TAT optimizes redundant trunks due to a call forward. In this case, the trunks between a terminating Meridian 1 node and tandem Meridian 1 node are optimized. The originating node is a DMS-250. Station C is a centralized attendant or a Meridian Mail position.

- Station A located at an originating switch (Public Central Office or Private Exchange), makes an internodal call through a tandem DMS-250 and a tandem Meridian 1 node to Station B located at a terminating Meridian 1 node (first call);
- Station B, located at the terminating Meridian 1 node, is call forwarded to Station C located at the tandem Meridian 1 node (redirected call). Station C is a centralized attendant or Meridian Mail position;
- Station C answers;
- Station A connects to Station C.

Figure 20
Anti-tromboning for Network Call Redirection (case 2), M1/DMS

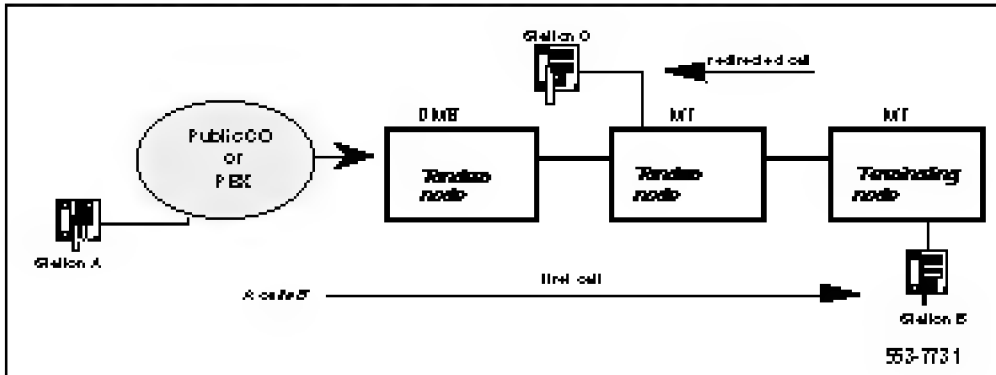
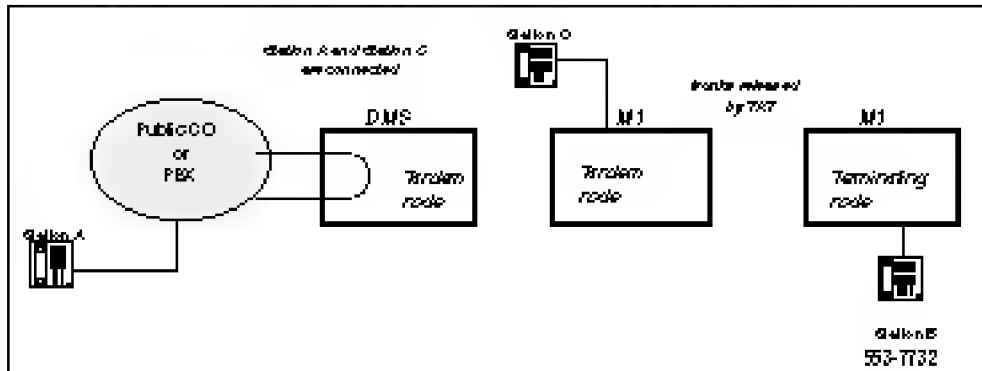


Figure 21 shows the results of anti-tromboning, after Station C answers the call.

- The trunks between the terminating Meridian 1 and the tandem Meridian 1 are released by TAT;
- Station C and Station A are connected.

Figure 21
Results of anti-tromboning for Network Call Redirection (case 2), M1/DMS



Anti-tromboning operation for Call Modification, DMS interworking with Meridian 1

In [Figure 22](#), the following case is represented for TAT as applied to a Call Modification scenario, with DMS interworking with Meridian 1 (in the example, a case of a call transfer is used. Please note that the same effect would take place if Station B conferences in Station C and then drops out, leaving Station A and Station C connected.)

- Station A, located at an originating Meridian 1 node, makes an internodal call through a tandem DMS node to Station B located at a terminating Meridian 1 node (first call);
- Station B, located at a terminating Meridian 1 node, answers the call and initiates a call transfer, through the tandem DMS node, to Station C located at the originating Meridian 1 node (second call);
- Station C answers;
- Station B completes the call transfer.

Figure 22
Anti-tromboning for Call Modification, DMS/M1

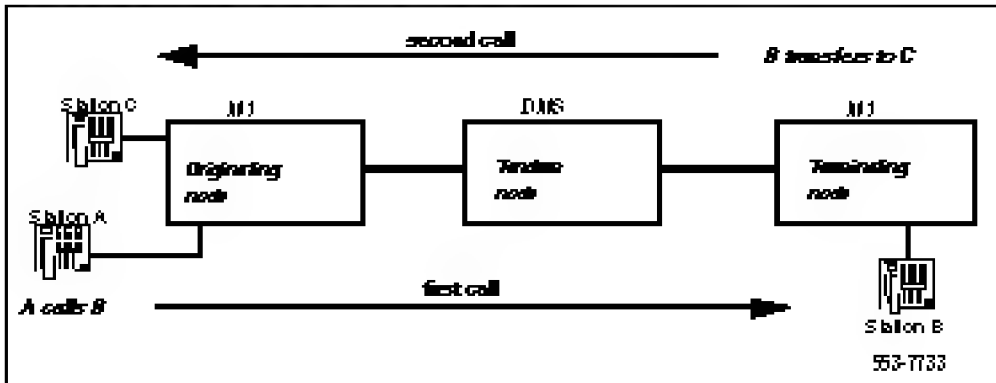
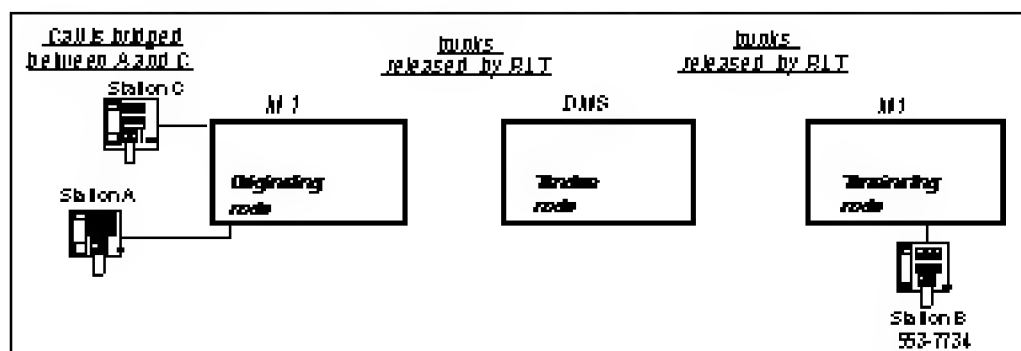


Figure 23 shows the results of anti-tromboning, after Station C answers the call.

- The call is bridged at the Meridian 1 originating node, between A and C;
- The trunks between the Meridian 1 terminating node and the DMS, and between the DMS and the Meridian 1 originating node and, are released by the RLT feature.

Figure 23
Results of anti-tromboning for network call transfer, DMS/M1



Anti-tromboning operation for Call Modification, Meridian 1 interworking with Meridian 1

In [Figure 24](#), the following case is represented for TAT as applied to a Call Modification scenario, with Meridian 1 interworking with Meridian 1 (in the example, a case of a call transfer is used.)

- Station A, located at an originating Meridian 1 node, makes an internodal call through a tandem Meridian 1 node to Station B located at a terminating Meridian 1 node (first call);
- Station B, located at a terminating Meridian 1 node, answers the call and initiates a call transfer, through the tandem Meridian 1 node, to Station C located at the originating Meridian 1 node (second call);
- Station C answers;
- Station B completes call transfer.

Figure 24
Anti-tromboning for network call transfer, M1/M1

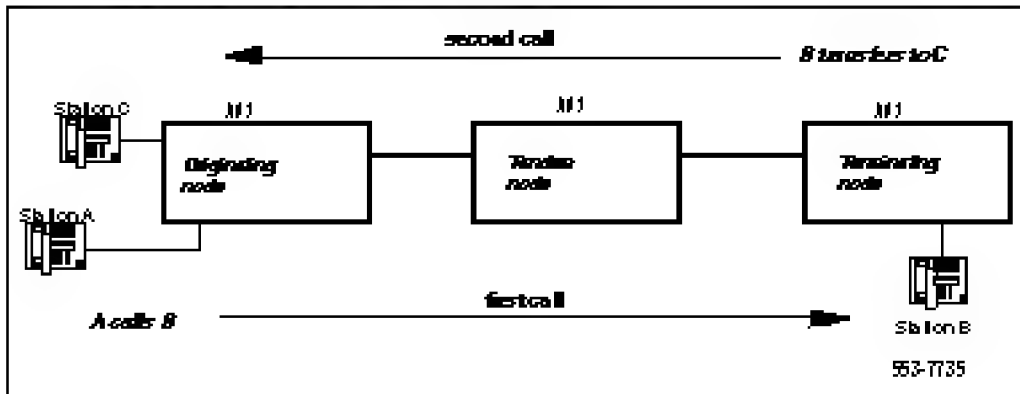
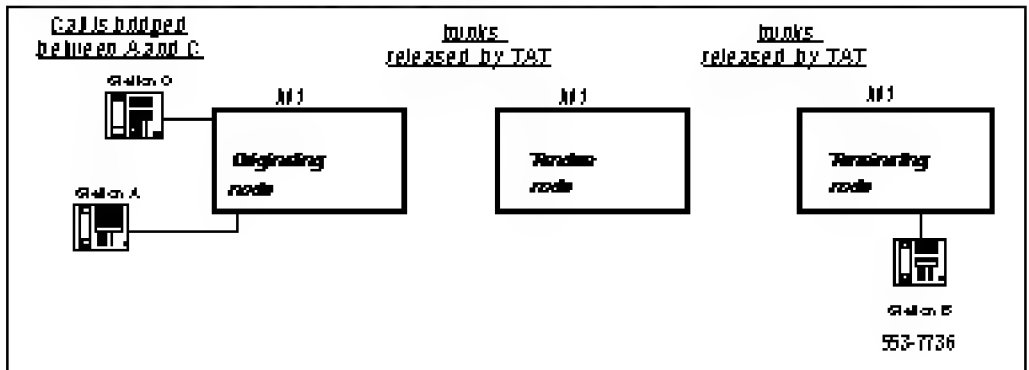


Figure 25 shows the results of anti-tromboning, after Station C answers the call.

- The call is bridged at the Meridian 1 originating node, between Station A and Station C;
- The tromboning trunks between the Meridian 1 terminating node and the Meridian 1 tandem node, and between the Meridian 1 tandem node and Meridian 1 originating node, are released by TAT.

Figure 25
Results of anti-tromboning for network call transfer, M1/M1



Trunk Anti-Tromboning and Trunk Optimization - Before Answer both equipped on the same Meridian 1

TAT and TRO-BA (including Virtual TRO-BA) may be configured together on the same Meridian 1 switch.

While TAT and TRO-BA both provide trunk optimization capabilities, there are major differences pertaining to how each feature optimizes trunks.

- If TAT and TRO-BA are both configured on the same Meridian 1 switch, TRO-BA takes precedence over TAT (refer to “TRO-BA takes precedence over TAT” on page 391.) TRO-BA attempts to optimize a route before a call is answered, and then TAT attempts to optimize trunks after the call has been answered. The TAT feature enhances this capability by eliminating redundant trunks between Meridian 1 and DMS-250 switches equipped with the MCDN Release Link Trunk (RLT) feature.
- TAT and TRO-BA both eliminate redundant trunks for calls that are redirected by Network Call Forward All Calls, Network Call Forward No Answer, Network Call Forward Busy, or Network Hunting.
- TRO-BA will not optimize tromboned trunks resulting from a Call Transfer, while TAT will.
- TRO-BA will not optimize tromboned trunks resulting from an incoming trunk call, while TAT will.
- In the case of a call triangulation scenario, TRO-BA will attempt to eliminate tromboned trunks, while TAT will not. However, in this scenario, tromboning may actually result after TRO-BA has performed optimization. In this case, TAT will attempt to optimize the trunks. Refer to “TRO-BA and TAT functionality in a call triangulation scenario” on page 398.

Note: For more detailed information on the TRO-BA feature, refer to the ‘Trunk Optimization-Before Answer’ feature description module in this document.

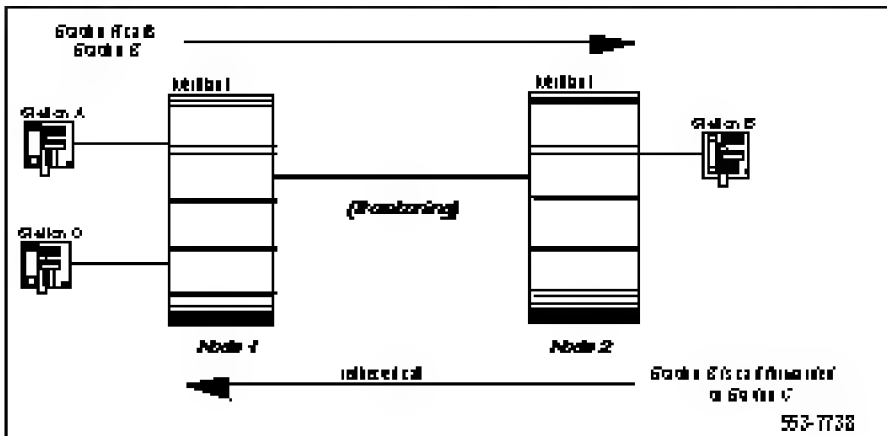
TRO-BA takes precedence over TAT

The following provides a basic example of how TRO-BA takes precedence over TAT in a call forward scenario.

Referring to **Figure 26**:

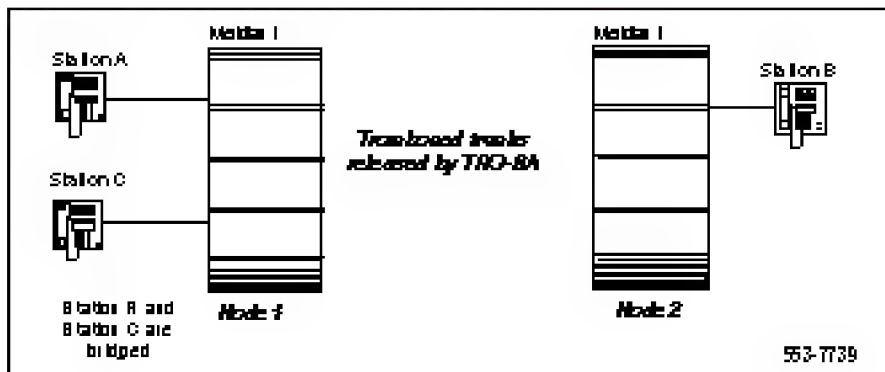
- Station A on Node 1 calls Station B on Node 2, over an ISDN PRI/ISL/VNS trunk;
- Station B on Node 2 is call forwarded all calls to Station C on Node 1, over another PRI/ISL/VNS trunk (redirected call.) This means that tromboning exists between Node 1 and Node 2;

Figure 26
TRO-BA/TAT operating together, before optimization in a call forward scenario.



Before Station C answers, TRO-BA releases the tromboned trunks between Node 1 and Node 2, and bridges Station A and Station C locally. Refer to [Figure 27](#). Since there no longer exist any tromboned trunks, TAT is not invoked.

Figure 27
After optimization has been applied by TRO-BA.

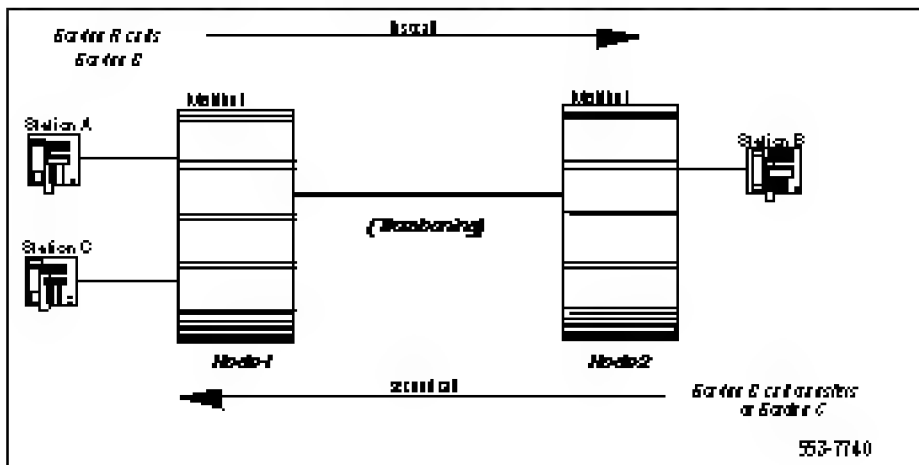


TRO-BA does not optimize trunks due to a call transfer - anti-tromboning is completed after the call is connected

As mentioned, TRO-BA will not release tromboned trunks that result from a call transfer. In this case, TAT will optimize the trunks, after the call is answered. Referring to **Figure 28**:

- Station A on Node 1 calls Station B on Node 2, over a PRI/ISL/VNS trunk (first call);
- Station B initiates call transfer to Station C on Node 1, over another PRI/ISL/VNS trunk, and completes the call transfer while Station C is still ringing. This means that a case of tromboning exists between Node 1 and Node 2 (second call);

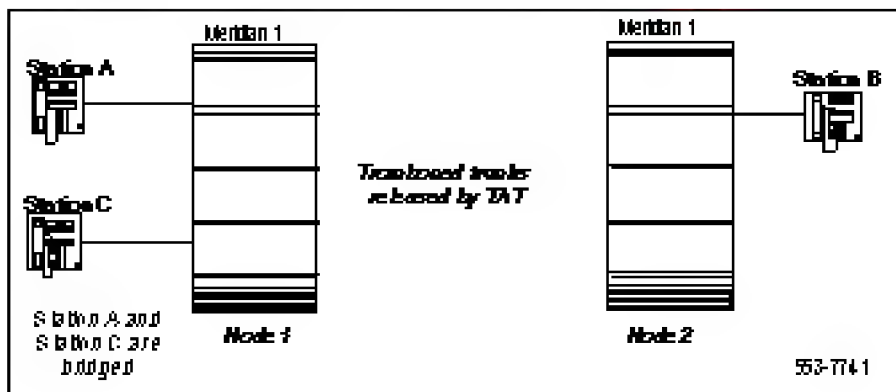
Figure 28
TRO-BA/TAT operating together, before optimization in a call transfer scenario.



Since TRO-BA does not release tromboned PRI trunks resulting from a call transfer, the trunks between Node 1 and Node 2 remain tromboned until Station C answers the call transfer.

While the call is still in ringing state, TRO-BA does not release the tromboned trunks. After Station C answers, TAT releases the tromboned trunks between Node 1 and Node 2, and bridges Station C and Station A locally. Refer to [Figure 29](#).

Figure 29
After TAT applied to tromboned trunks due to a call transfer.



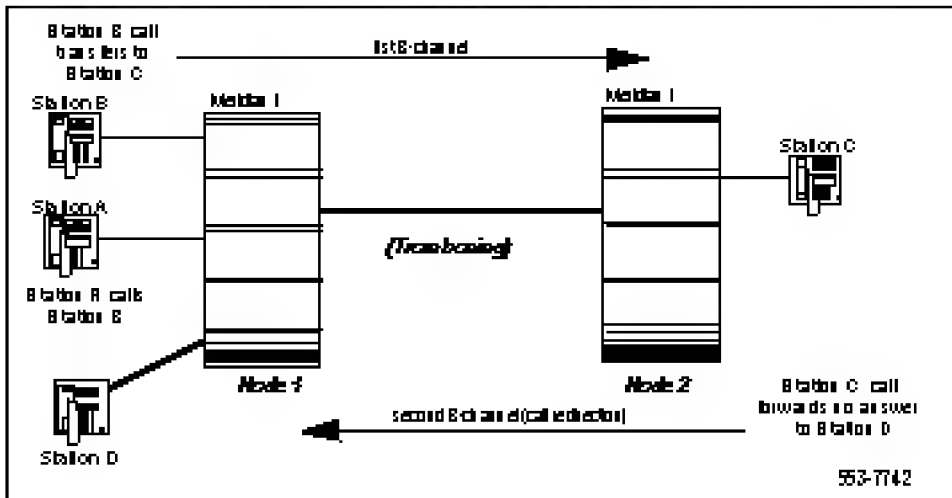
Trunk optimization with call redirection due to call transfer

Another case of TRO-BA and TAT interaction in the case of a call redirection initiated on the transfer key is as follows. Referring to

Figure 30:

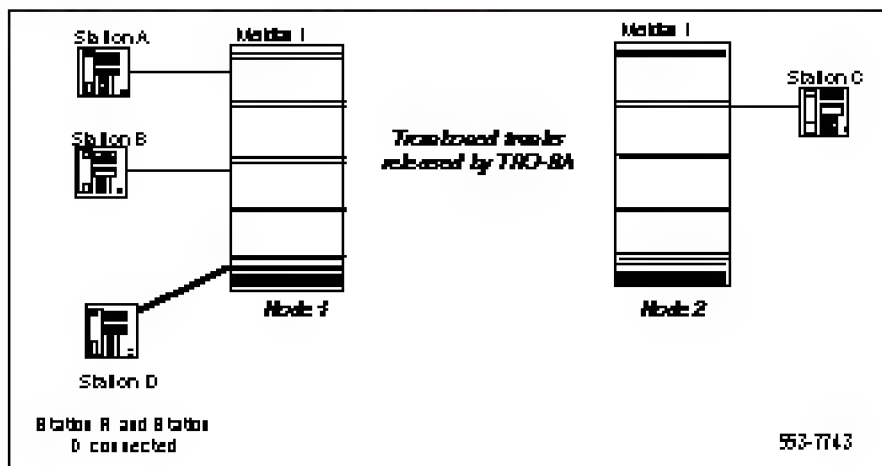
- Station A on Node 1 calls Station B, also on Node 1;
- Station B initiates a call transfer to Station C on Node 2, over a PRI/ISL/VNS trunk (first B-channel);
- Station C call forwards no answer to Station D on Node 1, over another PRI/ISL/VNS trunk (second B-channel, due to call redirection.) Therefore, tromboning of trunks exists between Node 1 and Node 2;

Figure 30
TRO-BA/TAT operating together, before optimization in a call transfer scenario.



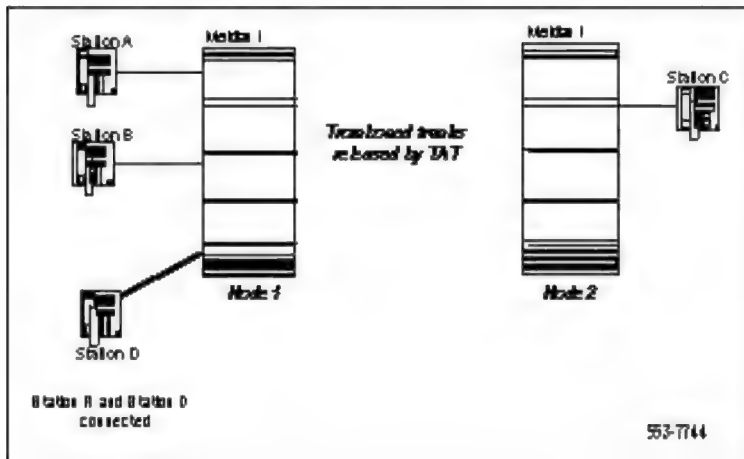
- Station B completes the call transfer while Station C is ringing. After the call is presented to Station D, TRO-BA optimizes the trunks, and bridges Station A and Station D locally. Refer to [Figure 31](#).

Figure 31
Tromboned trunks released by TRO-BA.



- If Station B does not complete the call transfer while Station C is ringing, but waits until Station D answers, TRO-BA will not perform optimization.
- After Station D answers, TAT applies anti-tromboning to release the trunks between Node 1 and Node 2, and bridges Station A and Station D locally. Refer to [Figure 32](#).

Figure 32
Tromboned trunks released by TAT



TRO-BA and TAT functionality in a call triangulation scenario

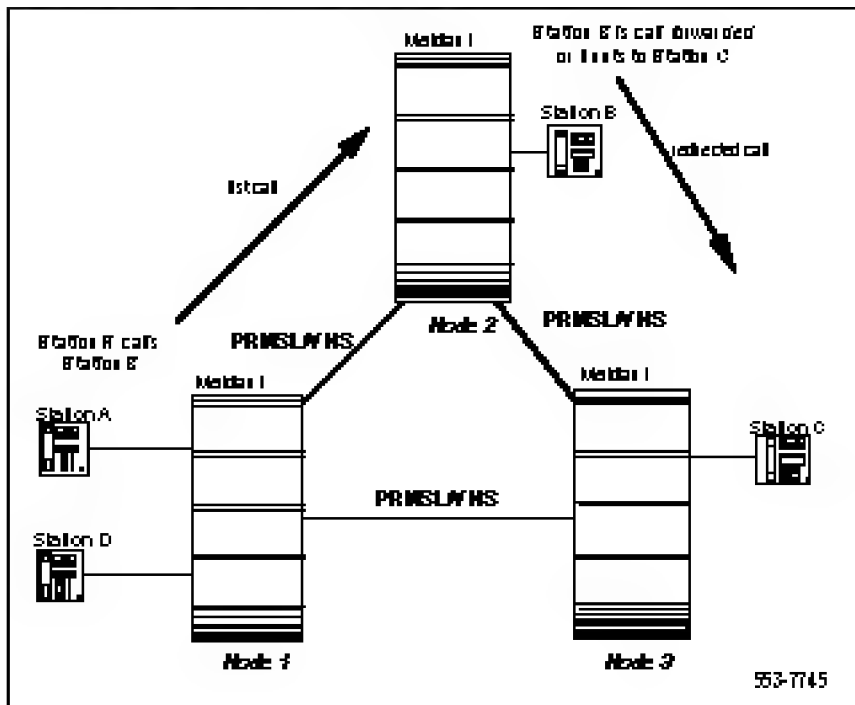
In the case of a call triangulation scenario, TRO-BA will attempt to eliminate tromboned trunks. TAT cannot perform this operation because a second D-channel is involved.

Referring to **Figure 33**:

- Station A on Node 1 calls Station B on Node 2 over a PRI/ISL/VNS trunk (first call);
- Station B on Node 2 is call forwarded or hunts to Station C on Node 3, over another PRI/ISL/VNS trunk (redirected call.) This means that two trunks are being used to handle one call;

Figure 33

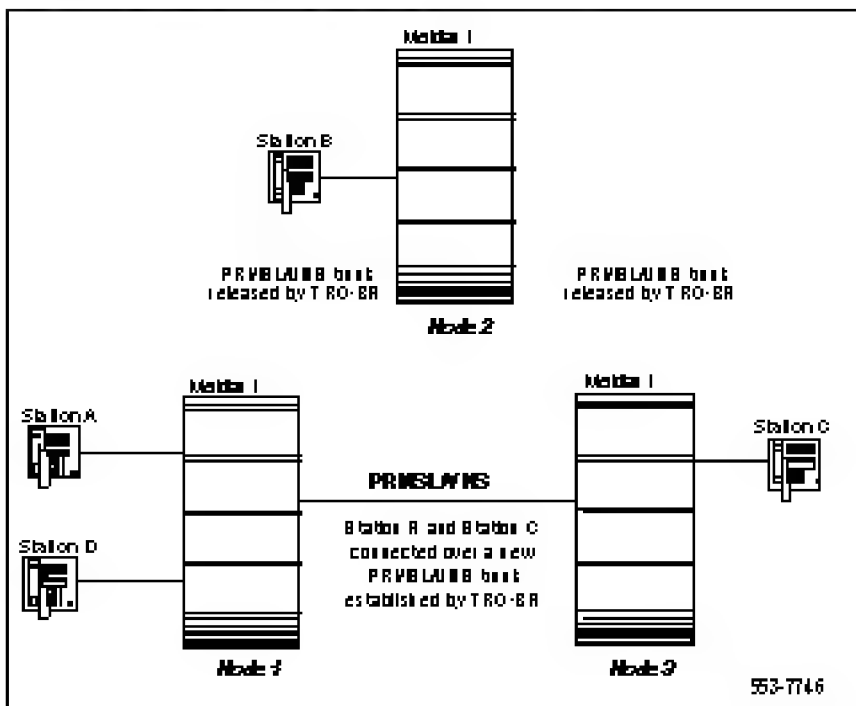
Call path before TRO-BA has been applied.



Before Station C answers, TRO-BA releases the trunks between Node 1 and Node 2, and between Node 2 and Node 3, and establishes a new PRI/ISL/VNS trunk connection between Node 1 and Node 3. Refer to **Figure 34**.

Note: The TAT feature cannot provide this functionality, because multiple D-channels are used.

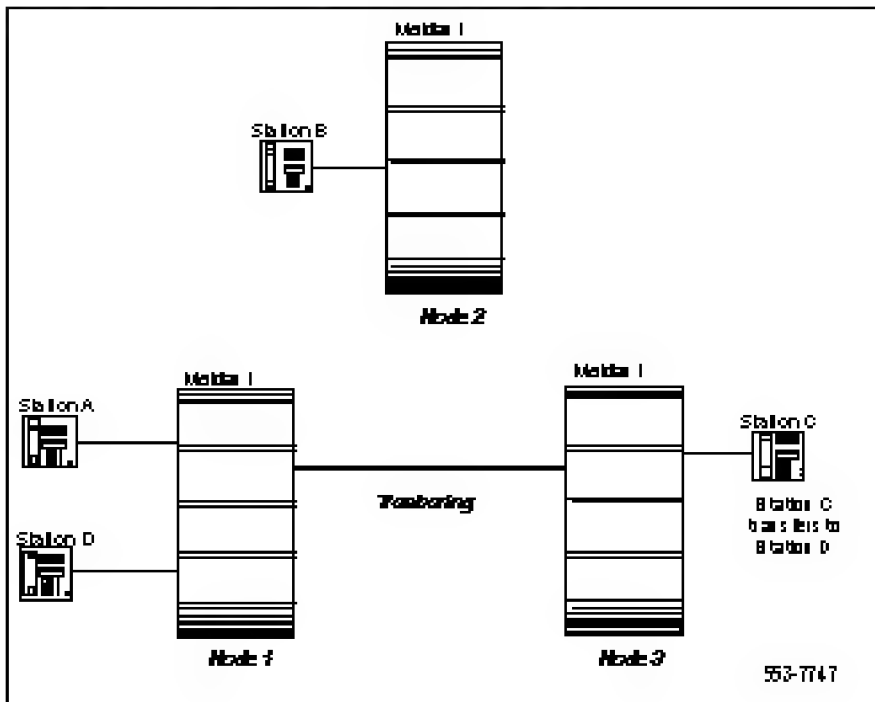
Figure 34
Call path after TRO-BA has been applied.



Tromboning may actually result after TRO-BA has performed optimization. In this case, TAT will attempt to optimize the trunks. An explanation whereby this scenario may occur follows.

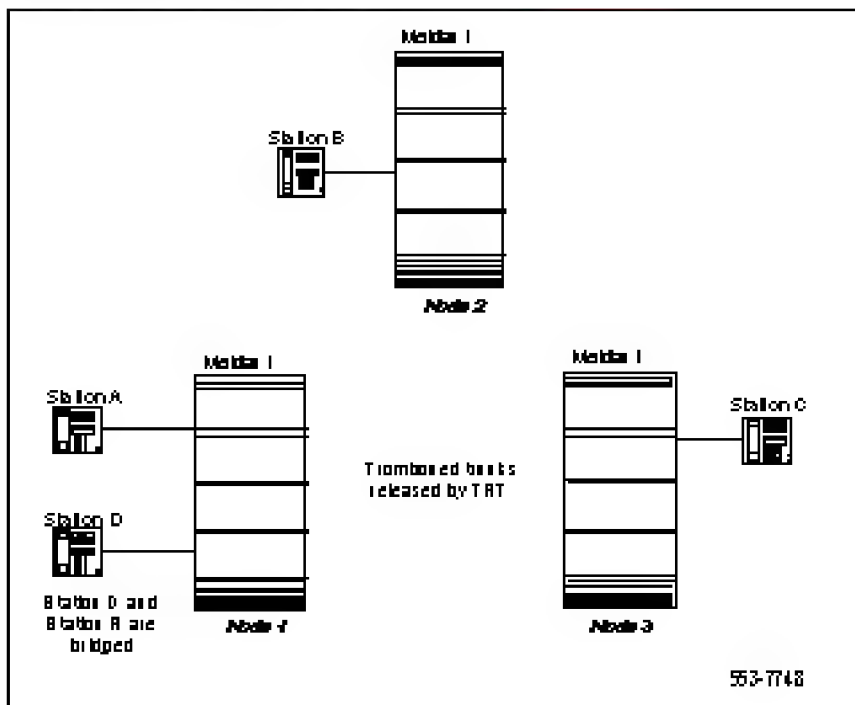
- Station C answers the call, and initiates a call transfer to Station D on Node 1, over a separate PRI/ISL/VNS trunk. This results in tromboning between Node 1 and Node 3. Refer to [Figure 35](#).

Figure 35
Tromboning of trunks after TRO-BA has been applied.



- After Station D answers the call, and Station C completes the call transfer, TAT releases the tromboned trunks between Node 3 and Node1, leaving Station D and Station A bridged locally. Refer to **Figure 36**.

Figure 36
Tromboned trunks released by TAT



Operating parameters

If the NTAK02BB SDI/DCH circuit card is used on systems with a software vintage earlier than Generic X11 Release 21.40, it must be ensured that the power is removed from the card before it is used for the operation of the Trunk Anti-Tromboning feature. This will normally take place during software upgrade; otherwise, the card must be removed and the power must be reset.

To support Trunk Anti-Tromboning within a dedicated ISL/VNS configuration, a NTAK02 (minimum vintage **BB**) DCH circuit card must be used.

Trunk Anti-Tromboning will only be supported on the NTBK51BA D-Channel Daughterboard, for D-channel handling with PRA.

Anti-tromboning will be performed only after the third party answers, and provided that the tromboning PRI/ISL/VNS or analog trunks are associated with the same primary D-channel (with or without a backup D-channel) and the trunks are associated with the same customer. Anti-tromboning will not be performed if the tromboning trunks belong to different customers on the same node (even though they are associated with the same primary D-channel.)

Anti-tromboning will not be performed for a tromboned call between two attendants on the same node.

There are two types of protocols used for TAT operations, depending on the interface type. One is for the Meridian 1 to Meridian 1 interface, and the other is for Meridian 1 to the DMS-250 Sprint load equipped with the Meridian Customer Defined Network Release Link Trunk (RLT) feature.

If non-ISDN PRI trunks are involved in a call transfer call, ISDN signaling messages cannot be sent and anti-tromboning will not be performed.

Anti-tromboning will not be performed for tromboned trunks associated with a call originating on a set, and routed back to the same set.

TAT can cause a momentary interruption in data transmission during optimization. When TAT operations are performed at multiple tandem nodes, this effect is cumulative (in the milliseconds range.) Therefore, the impact of this loss is dependent on the terminals on both ends of the transmission, and may be recovered through re-transmission.

Feature interactions

Note: The feature interactions described in this section assume that only TAT (and not TRO-BA) is configured on a Meridian 1 system.

If TRO-BA is also configured with TAT on the same system, TRO-BA will take precedence over TAT, where it can.

Attendant

If an attendant has activated Busy Verify or Barge-in at the time that a message to invoke TAT is received, the anti-tromboning operation will be aborted.

Automatic Call Distribution (ACD)

The Trunk Anti-Tromboning feature will perform anti-tromboning operations to eliminate the PRI trunks associated with the same D-channel due to the following ACD operations: Enhanced Network Call Forward; Network ACD; Interflow Options; and Enhanced Interflow.

If an ACD agent is being observed at the time that a message to invoke TAT is received, the anti-tromboning operation will be aborted.

If an incoming PRI call that is in the ACD queue is answered by a Recorded Announcement (RAN), then the anti-tromboning operation will be performed only after an ACD agent answers the call.

Call Park Network Wide

The Trunk Anti-Tromboning feature is invoked if programmed at all interim Private Branch Exchanges (PBXs) in the call.

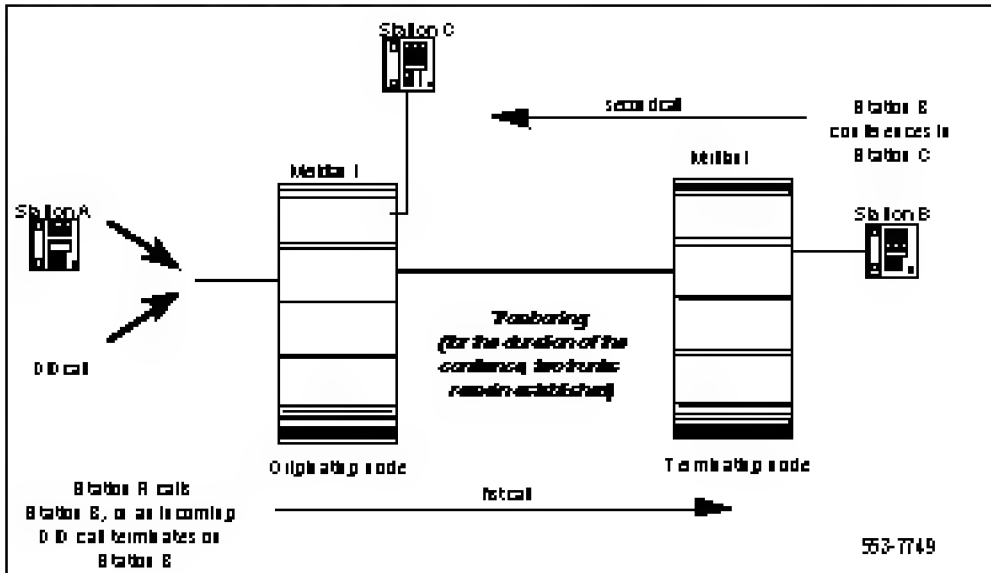
Conference

If the Conference feature is activated, the Trunk Anti-Tromboning feature will perform the anti-tromboning operations only when there are two parties remaining in the call, and the two parties are using PRI trunks associated with the same D-channel.

Referring to **Figure 37**:

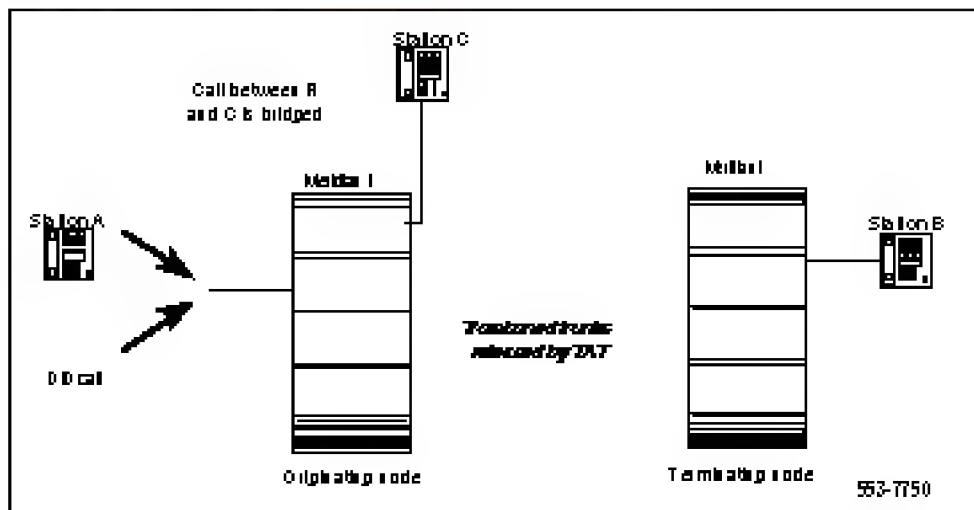
- Station A, or an incoming DID trunk call, at the originating node, is connected to Station B at the terminating node over a PRI/ISL/VNS or analog trunk (first call);
- Station B conferences in Station C, also located at the originating node, over a second PRI/ISL/VNS or analog trunk that is associated with the same D-channel as the first (second call);
- During the extent of the three-party conference, the two trunks are tromboned.

Figure 37
Conference call before TAT



When Station B drops out of the conference, anti-tromboning is invoked (TAT will not be invoked as long as the conference call situation exists.) The two tromboned trunks are released, and Station A, or the DID trunk, and Station C are bridged. This is illustrated by **Figure 38**.

Figure 38
Conference call after TAT



External Recorded Announcement.

If an attendant originates a call which, through call modification or call redirection creates tromboned trunks, and eventually terminates on a RANX equipment, TAT will not optimize the trunks. That is, TAT will not release tromboning PRI/ISL/VNS trunks resulting from an attendant initiating an outgoing trunk call.

INIT ACD Queue Call Restore

Trunk Anti-Tromboning is not supported on a call restored by INIT ACD Queue Call Restore.

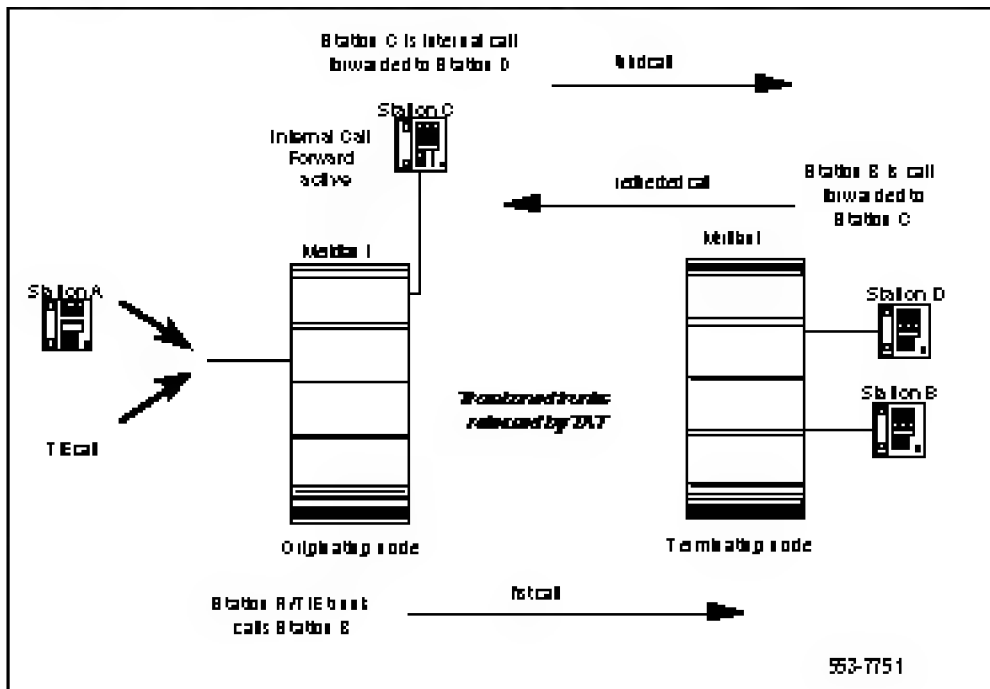
Internal Call Forward (Meridian 1 to Meridian 1)

TAT will not affect the operation of Internal Call Forward between two Meridian 1 switches, while applying anti-tromboning to trunks.

Referring to **Figure 39**:

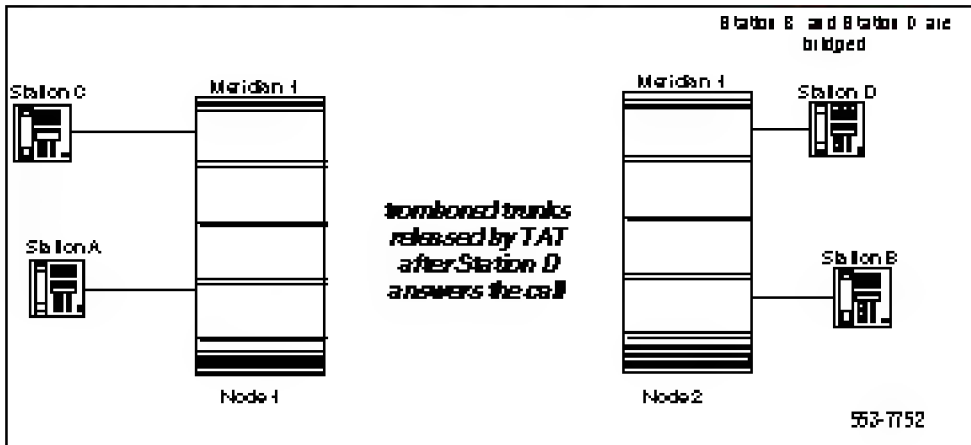
- Station A, or an incoming TIE trunk, on Node 1 calls Station B at Node 2. The call terminates on Station B at Node 2, over a PRI/ISL trunk (first call);
- Station B on Node 2 is call forwarded to Station C on Node 1 (redirected call). The trunks are tromboned.
- If the call is determined to be internal, and Station C is Internal Call Forwarded to Station D, the call is automatically forwarded to Station D on Node 2 over a third PRI/ISL trunk.

Figure 39
Internal Call Forward before TAT, Node 2 is a Meridian 1.



After Station D answers the call, TAT releases the tromboned trunks between Node 1 and Node 2. Refer to **Figure 40**.

Figure 40
Internal Call Forward after TAT, Node 2 is a Meridian 1

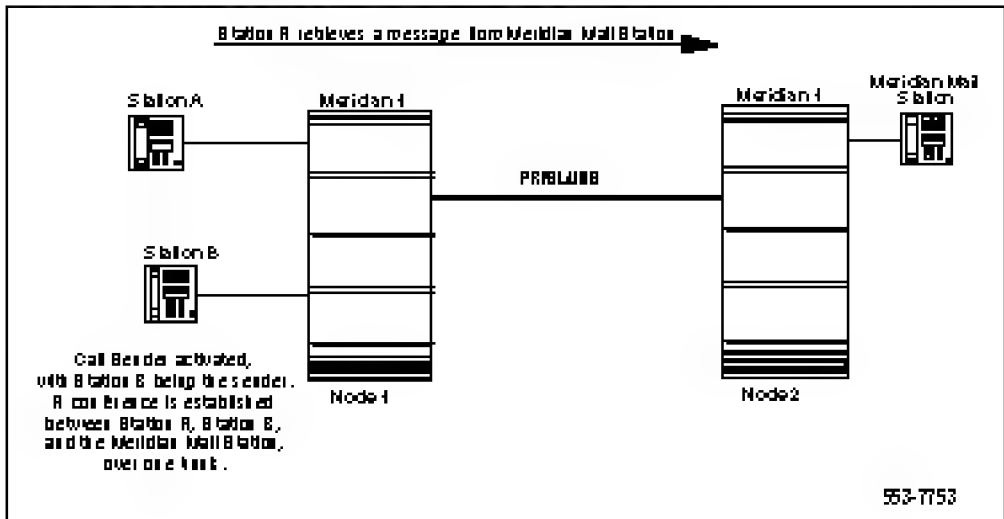


Meridian Mail

The TAT feature will release tromboned PRI/ISL/VNS trunks arising from the application of the Auto Attendant, Through-Dialing, and Operator Revert capabilities of Meridian Mail. If Network Message Services is activated, the associated Call Sender capability does not create an additional trunk when it is activated. Therefore, TAT is not applied. Referring to **Figure 41**:

- Station A, on Node 1, retrieves a message from a Meridian Mail station located on Node 2;
- Call Sender is activated, with Station B, located on Node 1, being the sender;
- Station A directly conferences in Station B. A consultation conference between Station A, Station B, and the Meridian Mail station is then established over one PRI/ISL/VNS trunk.

Figure 41
Call Sender operation, with Network Message Services active



Network Attendant Service (NAS)

If both TAT and NAS are equipped in a Meridian 1 network, the NAS feature takes precedence over TAT, if NAS is equipped end-to-end. There is no interworking between NAS and TAT. Refer to Figure 42 for the following calling scenarios.

Scenario 1

Station C at Node 2 calls the attendant at the remote node (Node 3), over a PRI trunk. The attendant extends the call to Station D, also at Node 2, over a separate PRI trunk. These trunks are considered to be tromboned.

Case 1 - TAT and NAS are equipped on all nodes

When Station D answers, The NAS functionality drops the tromboned trunks, and Station C and Station D are bridged.

Case 2 - NAS is not equipped

If NAS is not equipped, TAT performs anti-tromboning operations, removing the tromboned trunks and bridging Station C and Station D.

Scenario 2

Station A at Node 1 calls the attendant at Node 3, and the attendant extends the call to Station B on Node 1.

Case 1 - TAT and NAS are equipped on all nodes

If NAS and TAT are both equipped between Node 1 and Node 2, and between Node 2 and Node 3, then NAS takes precedence over TAT to optimize the tromboned trunks between Node 1 and Node 2, and Node 2 and Node 3.

Case 2 - NAS is not equipped

If only TAT is equipped between Node 1 and Node 2, and between Node 2 and Node 3, then TAT will release the tromboned trunks between Node 1 and Node 2, and Node 2 and Node 3.

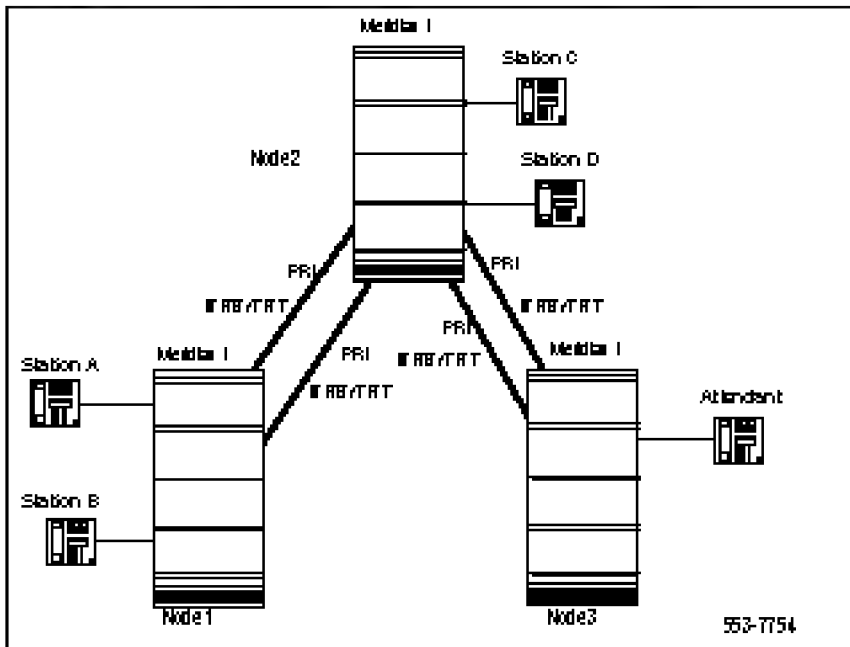
Case 3 - NAS is equipped between Node 1 and Node 2, and TAT is equipped between Node 2 and Node 3

If only NAS is equipped between Node 1 and Node 2, and only TAT is equipped between Node 2 and Node 3, then TAT releases the tromboned trunks between Node 2 and Node 3, and the call is bridged at Node 2. NAS does not optimize the tromboned trunks between Node 1 and Node 2.

Case 4 - TAT is equipped between Node 1 and Node 2, and NAS is equipped between Node 2 and Node 3

If only TAT is equipped between Node 1 and Node 2, and only NAS is equipped between Node 2 and Node 3, no anti-tromboning will be performed, because NAS is not equipped end to end.

Figure 42
NAS/TAT interworking



Network Call Pickup

The TAT feature will optimize tromboned trunks arising from the operation of the Network Call Pickup feature. For example, in [Figure 43](#), Station A on Node 1 makes a call to Station B on Node 2 over a PRI/ISL/VNS or analog trunk. The call is picked up by station C on Node 1, over a separate PRI/ISL/VNS or analog trunk. After the call has been picked up, TAT will apply anti-tromboning to release the two tromboned PRI trunks. Station A and Station C are connected locally. Refer to [Figure 44](#).

Figure 43
Network Call Pickup before TAT

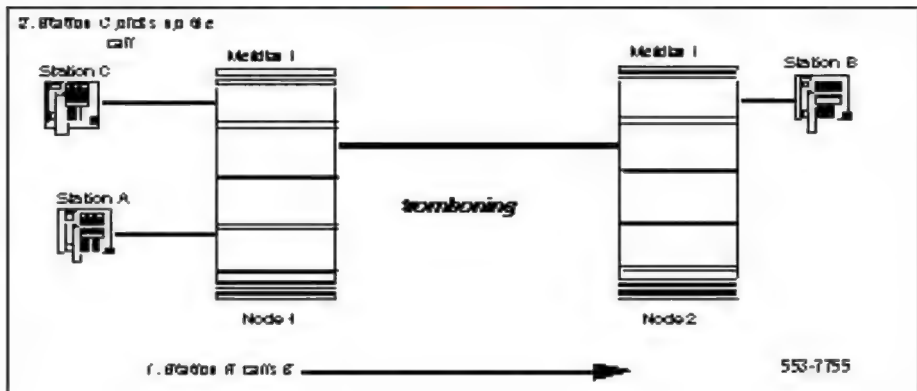
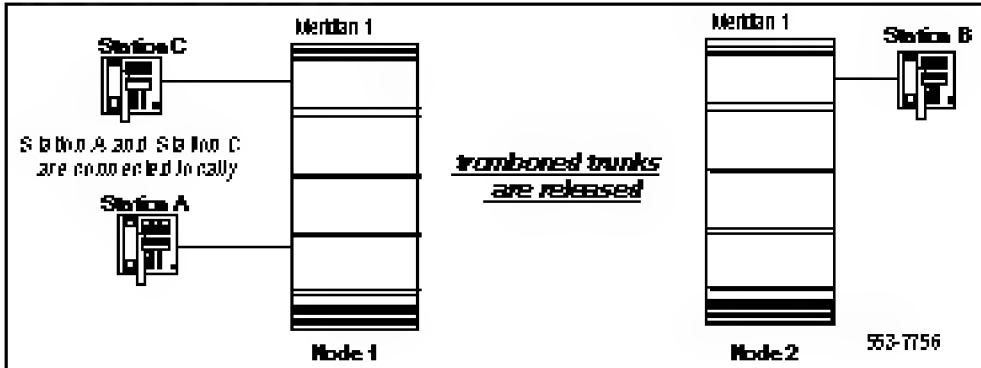


Figure 44
Network Call Pickup after TAT



Network Call Redirection

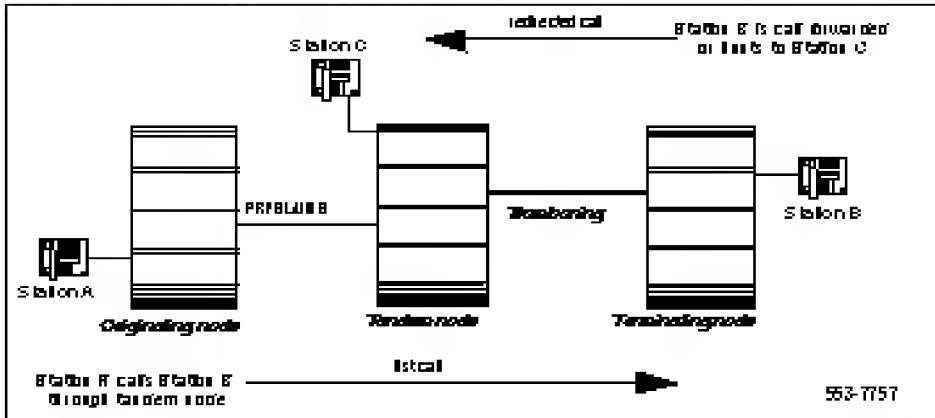
The Trunk Anti-Tromboning feature eliminates the tromboning of PRI/ISL/VNS or analog trunks resulting from the operation of any of the following Network Call Redirection features:

- Network Call Forward Unconditional
- Network Call Forward No Answer
- Network Call Forward Busy
- Network Call Forward by Call Type
- Network Hunt
- Internal Call Forward

Figure 45 illustrates the following scenario:

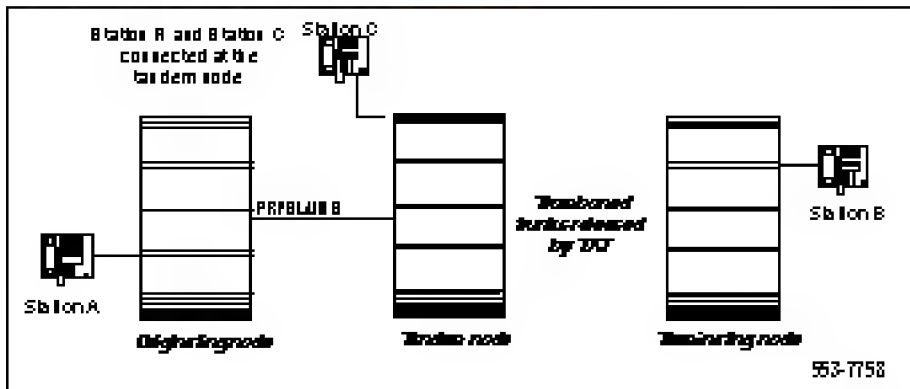
- Station A, on the originating node, calls Station B, on the terminating node, across a tandem node over a PRI/ISL/VNS trunk (first call);
- Station B is call forwarded or hunts over another PRI/ISL/VNS trunk, to Station C located on a tandem node (redirected call.) This causes tromboning between the terminating and the tandem nodes.

Figure 45
Network Call Redirection before TAT



After Station C answers, anti-tromboning is invoked. This causes the tromboned trunks to be released. Station A and Station C are connected at the tandem node. The results of this anti-tromboning are shown in [Figure 46](#).

Figure 46
Network Call Redirection after TAT



Radio Paging System

If an attendant originates a call which, through call modification or call redirection creates tromboned trunks, and eventually terminates on a Radio Paging equipment, TAT will not optimize the trunks. That is, TAT will not optimize tromboning PRI/ISL/VNS trunks resulting from an attendant initiating an outgoing trunk call.

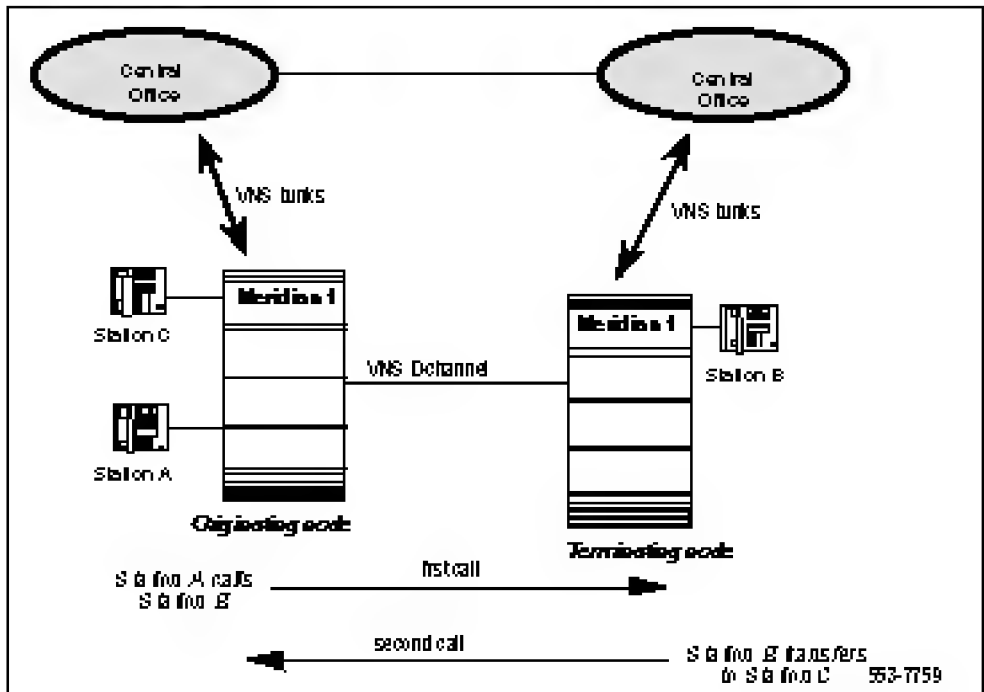
Trunk Route Optimization - Before Answer

See “Trunk Anti-Tromboning and Trunk Optimization - Before Answer both equipped on the same Meridian 1” on page 390.

Virtual Network Services (VNS)

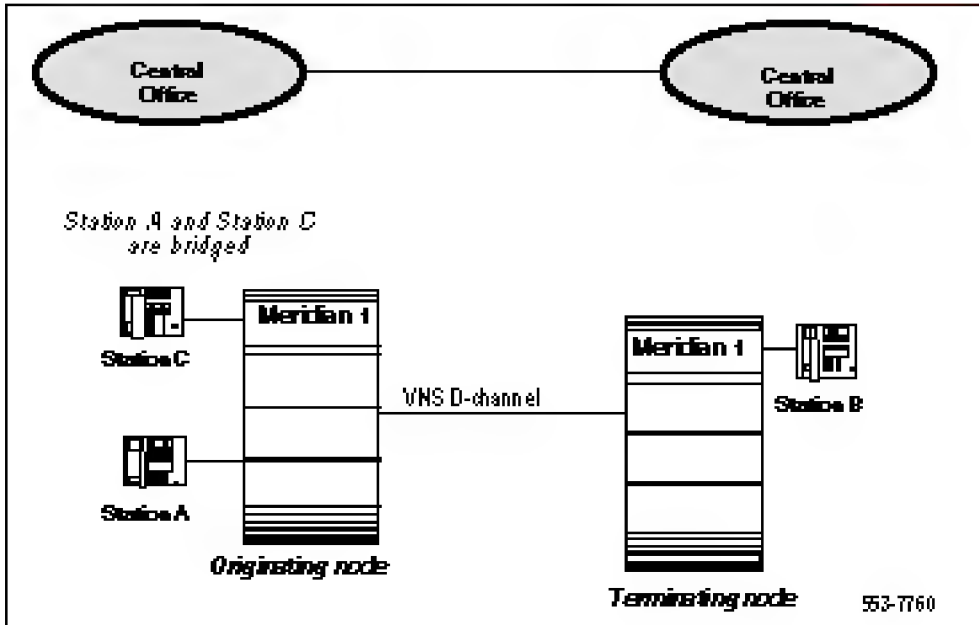
The Trunk Anti-Tromboning feature will perform anti-tromboning operations to eliminate tromboned trunks (physical B-channels) associated with the same VNS D-channel. For example, in [Figure 47](#), Station A at the originating node calls Station B at the terminating node, over a VNS D-channel trunk. Station B transfers the call to Station C, also located at the originating node. The physical B-channel trunks associated with the D-channels are considered to be tromboned.

Figure 47
VNS before TAT



After Station C answers, the tromboned trunks are released, and Station A and Station C are bridged. Refer to [Figure 48](#).

Figure 48
VNS after TAT.



Feature packaging

The Trunk Anti-Tromboning is packaged under (TATO), package 312. The following packages are required as dependencies:

- Multi-purpose Serial Data Link (MSDL) package 222;
- Integrated Services Digital Network (ISDN) package 145; and
- 1.5 Mbps Primary Rate Access (PRA) package 146; or
- Integrated Service Digital Network Signaling Link (ISL) package 147; and, optionally
- Advanced ISDN Network Services (NTWK) package 148.

Feature implementation

LD 17 — Configure TAT functionality to be performed at the far-end switch.

Prompt	Response	Description
REQ	CHG	Change existing data.
TYPE	ADAN	Type of change.
- ADAN		Action Device and Number.
	NEW DCH x CHG DCH x	Add D-channel x. Change D-channel x.
- CTYP	MSDL DCHI	The NTBK51BA D-Channel Daughterboard with PRA. The NTBK51BA D-Channel Daughterboard with ISL/VNS.
- CDNO	1-10	The card number for the Downloadable D-channel.
- PORT	1	Port number on NTBK51BA D-Channel Daughterboard. Only port 1 is valid for the Option 11.
...		
- IFC	SL1 S100 D100 D250	Interface type for D-channel. Either SL1, S100, D100, or D250 may be entered. Currently, SL1 and D250 are the only interfaces supported by TAT.
...		
- RLS	xx	Release ID of the switch at the far end of the D-channel. Release 21 or higher must be entered.
- RCAP	TAT	Remote Capabilities. TAT must be entered to enable Trunk Anti-Tromboning.

Feature operation

The Trunk Anti-Tromboning feature is transparent to the user, provided all datafills and hardware are assigned and equipped properly.

Trunk Optimization (Meridian-1 to Meridian-1 only)

Trunk Optimization provides better utilization of customer networking facilities. The Trunk Optimization feature allows the Meridian 1/SL-1 to optimize trunks for redirected calls before answer. Trunk Optimization works with Call Forward All Calls, Call Forward No Answer, Hunting, and Busy Conditions, and avoids unnecessary use of additional channels or trunks.

Trunk Optimization does not apply to DID calls or calls originated by a non-ISDN TIE trunk.

An example of Trunk Optimization is shown in [Figure 49](#). If a call is placed from originating station A to a remote station B over route 1, and the call is forwarded to station C over route 3, the system can reconnect calls on the most economical route available. In this case, the call is physically directed over route 2, allowing routes 1 and 3 to be used for additional calls.

It is important to point out the mechanism used to achieve trunk optimization:

- The redirecting node will send a message to the originating node informing it of the redirection number and the redirection reason.
- If the originating node supports trunk optimization and has a first route choice member available to the destination PBX, it will send a message back accepting Trunk Optimization.

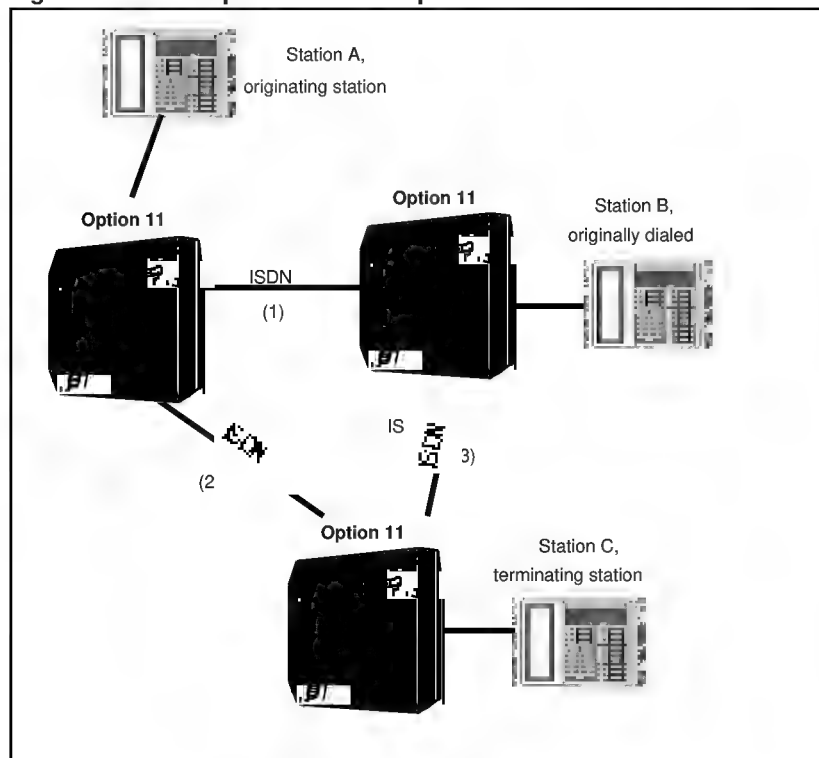
Note: First choice member is part of ESN route list entries in overlay 86.

- The redirecting node will send a message to release the connection.
- The originating node will confirm the disconnect and will establish a new non-redirectioned connection to the redirectioned number.

This process may repeat itself for every redirection hop that a call takes. The number of hops is software programmable.

If the originating node does not support Trunk Optimization, the call will then proceed without optimization on the current route. Trunk Optimization is programmable on a route basis using prompt TRO.

Figure 49- Trunk Optimization example



Note: TRO does not apply to DID calls or calls originated by a non-ISDN TIE trunk. TRO is transparent to users for NCRD.

If the users have alpha-numeric display telephone sets:

- the “calling party” will see:
 - the number originally dialed,
 - the number connected to, and
 - the reason for redirection

- the “called party” will see:
 - the originating number,
 - the originally called number, and
 - the reason for redirection

Package Requirements

The Trunk Optimization feature requires the following software options:

ISDN	option 145
ISL	option 147
NTWK	option 148
PRI	option 146

Note: The above scenarios require that an ISDN Primary Rate Interface (PRI) or ISDN Signaling Link (ISL) network is in place between the Meridian 1/SL-1s.

Trunk to Trunk Connection

The Trunk to Trunk Connection feature introduces the following capabilities: transfer on ringing of an external trunk across the network, transfer of one supervised outgoing external trunk to another, conference of external trunks and outgoing trunk to trunk charging. These capabilities are available to a PBX set, Meridian 1 proprietary set or an Attendant Console.

Transfer on Ringing of External Trunk over Network

Allows the transfer on ringing of an established external trunk call over a supervised network trunk. If the called party does not answer within a specified time, the call will slow answer recall to the attendant on the transferring node. This capability ensures that available network resources are not occupied indefinitely.

Transfer of Outgoing External Trunk

Allows the connection of one outgoing external trunk to another through Call Transfer provided that both external trunks are supervised. This capability prevents external trunks from remaining connected indefinitely in instances where an external party disconnects when disconnect supervision is not available.

Conference of External Trunks

Allows external trunks to remain established in a conference call in circumstances when all external trunks involved in the call offer disconnect supervision.

Outgoing Trunk to Trunk Charging

Ensures that outstanding charging information, relevant to both outgoing calls, is contained in relevant Call Detail Recording records.

Operating parameters

Slow answer recall occurs when an external trunk is transferred on ringing across an answer supervised network TIE trunk to a set that does not answer. However, the resulting recall will be to an attendant on the transferring node and not to the original set which transferred the call.

When transferring one outgoing trunk to another, it is required that the two external calls involved are both answered prior to completing the transfer. Both external trunks involved must have both answer and disconnect supervision.

When the last internal party disconnects from a conference call, involving two or more external trunks, all external trunks must have disconnect supervision for the call to remain established. If any one of the remaining external trunks does not have disconnect supervision, all external trunks will be dropped.

Feature interactions

Call Transfer

To transfer an external trunk on ringing across the network, the external trunk and internal TIE line must have both answer and disconnect supervision, and the external call must be established. To transfer one outgoing external trunk to another, both external trunks must have answer and disconnect supervision, and both external calls must be established.

Centralized Answering Position

The Option 11C system may not have an actual attendant console. Instead, the Option 11C will use Centralized Answering Position (CAP). The CAP Directory Number (DN) is the customer Night DN. Since no attendant is configured, the customer is viewed to be in Night Service and any calls for the attendant are directed to the CAP. Slow Answer Recall may be presented to a CAP when no attendant console is configured for the customer.

Conference

Trunk to Trunk connection allows external trunks to remain established in a call, provided that all external trunks involved have disconnect supervision. With respect to charging costs associated with a conference call, once the last set involved in the conference call disconnects, a search is made of all remaining trunks in the call to determine which call is established in the call for the longest period of time. This trunk is the chargeable Terminal Number (TN). This process is repeated to find the next chargeable TN.

Message Registration

The last party releasing the call collects the total value of outstanding Periodic Pulse Metering (PPM) generated on outgoing trunks. If the last party is an internal set, the outstanding PPM is stored against the meter of the set. If the last party is an internal TIE trunk, the outstanding PPM is stored against the meter associated with the internal TIE trunk access code. If the last party is an outgoing external trunk, the outstanding PPM is stored against the meter associated with the external trunk access code.

Night Service

If an attendant is placed in Night Service, calls to the attendant are directed to a station with the Night DN. Recalls are not directed to the Night DN. Recalls are put in the attendant call waiting queue when in Night Service.

Trunk Barring**Trunk Group Access Restriction**

Trunk Barring and Trunk Group Access Restriction takes precedence over the Trunk to Trunk Connection feature.

Feature packaging

Trunk to Trunk Connection is included in base X11 system software.

Note: DID to TIE (DTOT) for Japan package 176 must be restricted to enable this feature.

Feature implementation

LD 15 – Modifications to Customer Data Block.

Prompt	Response	Description
REQ	CHG	Change.
TYPE	ATT	Attendant console prompts.
CUST	0-31	Customer number.
- RTIM	xxx yyy zzz	Enter defined value for the Slow Answer Recall timer where: xxx = 0-(30)-378 Slow Answer Recall yy y= 0-(30)-510 Camp On Recall zzz = 0-(30)-510 Call Waiting Recall
<CR>		
TYPE	NET	Trunk and network options.
CUST	0-99	Customer number.
...		
- ISDN	YES	Change the Integrated Services Digital Network options.

...		
- PSTN	NO	Enter "NO" to allow no limit on the number of Public Switched Telephone Network trunks in any one network connection.
...		
- DITI	YES	Allow Direct Inward Dialing to TIE connections for customer.
- TRNX	YES	Allows transfer on ringing of supervised external trunks across the network. If "NO" is entered, transfer on ringing of supervised external trunks across the network are prevented.
- EXTT	YES	Allows connection of supervised external trunks. If "NO" is entered, connection of supervised external trunks is prevented.

Feature operation

No specific operating procedures are required to use this feature.

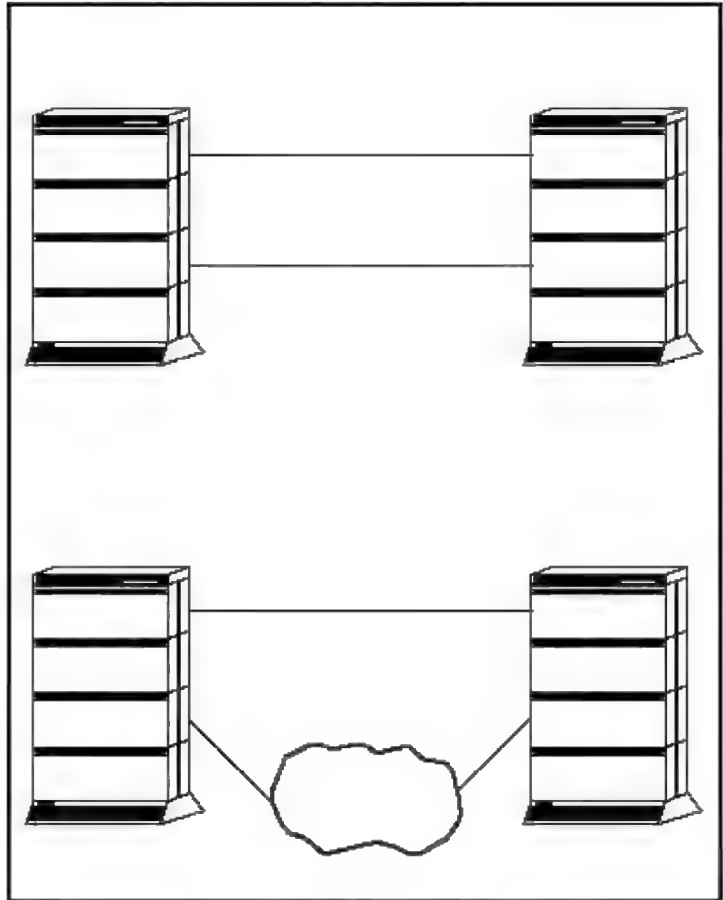
Virtual Network Services

The Virtual Network Services (VNS) feature offers a means to use Meridian 1 Integrated Services Digital Network (ISDN) networking features when two Meridian 1 systems are linked by a D-channel and an available Public Switched Telephone Network (PSTN) trunk exists. The PSTN trunks in this configuration serve as the B-channel for the call's duration.

VNS is an enhancement of the ISDN Signaling Link (ISL) interface. The enhancement allows the voice and the signaling of a call to take different physical paths. In the case of an ISL call, the D-channel is used for signaling, whereas the voice/data uses a TIE trunk (Meridian 1 to Meridian 1 connection only). The VNS feature extends the number of trunk types supported for the voice path by including the possibility of using different public trunks (e.g., COT, DID, DOD).

Figure 50 depicts the difference between two nodes linked by an ISL interface and two nodes linked using VNS.

Figure 50
VNS Interface/ISL Interface Comparison



Similar to the case of an ISL interface, the D-channel used for VNS can be shared with the D-channel of a Primary Rate Interface (PRI) that links two Meridian 1 switches, or it can use a D-channel that communicates with the far end through a pair of dedicated line modems, dial-up modems, or Meridian 1 data adapters.

When the D-channel used by VNS is on a PRI, the D-channel mode is defined as USR = SHAV, in LD 17, meaning that VNS, ISL and ISDN PRI calls can share this D-channel. In the other situation, the D-channel is defined as (USR = VNS in LD 17) which allows ISL, and VNS calls to use this D-channel for signaling.

The following types of trunks and connectivities can be used for VNS calls:

The following types of trunk and connectivity can be used for VNS calls:

- PRI trunks with:
Meridian Customer Defined Network (MCDN) connectivity.
- Analog trunks with:
disconnect supervision.
- 1.5 Mbps Digital Trunk Interface (DTI) trunks with:
Digitone Signaling (DTN), or Dial Pulse Signaling (DIP)
connectivity.

All of these trunks are being referenced throughout this document as the VNS Bearers, or simply the Bearer trunks.

Although the VNS feature can use Central Office Trunks (COT), Direct Outward Dialing (DOD), and Direct Inward Dialing (DID) trunks to link two Meridian 1 nodes, VNS calls are presented, handled, and interact with other features as though private ISDN TIE trunks are used for that purpose. The exceptions that apply are stated in the “Feature interactions” section.

Note that TIE trunks can also be used with VNS. When this is the case, the connection does not necessarily need to be a direct Meridian 1 to Meridian 1 connection (e.g., when QSIG is used).

Speechpath availability

When extending a call to a Remote node, the attendant relies on the tones and lamp states to determine if it is possible to extend a call, camp-on a busy extension, break-in to a conversation, etc.

When using a VNS Bearer trunk, the tones can be those of the PSTN (especially for “intelligent” trunks such as ISDN connectivity). For example, when extending a call to a busy set over an ISDN PSTN Bearer, the attendant hears busy tone (from the PSTN) instead of silence.

If Attendant Console operation has to remain the same with VNS, an answer signal has to be sent right away to the PSTN for attendant extended calls, whatever the state of the terminating party. This allows the attendant to hear the tones coming from the terminating Meridian 1 node, instead of tones from the PSTN.

The prompt VRAT exists for the incoming Bearer route (LD 16) to allow or disallow automatic answering of attendant extended calls. The Network Attendant Service (NAS) feature must be configured to provide this functionality.

When a route is configured with VRAT = YES, tones are similar to those provided on a private Meridian 1 ISDN PRI network; however, some unanswered calls may be charged. If a route is configured with the default value (VRAT = NO), tones heard when extending a call from the attendant might be different than the ones provided over a private Meridian 1 ISDN network. Users are not charged for unanswered calls.

PSTN clearing of unanswered calls

In some countries, a PSTN call left unanswered is disconnected after a few minutes, in order to reduce the usage of equipment that has not been paid for. This creates a major difference between private networks using TIE lines and private networks using VNS. For example, with VNS a call left in a camp-on state would be cleared by the public network after several minutes.

The VNS Set Speechpath (VSS) timer of the incoming Bearer route (LD 16) can be configured to avoid this situation. It defines the interval after which an answer signal is sent from the terminating Meridian 1 node to the Public Exchange/Central Office.

The configuration of the VSS timer has an impact on the cost of the calls, because the public network starts charging upon the reception of the answer signal.

Numbering Plan

A requirement of VNS is that customers have to configure VNS DNs (VDNs) as part of their numbering plan. The VNS VDN expansion feature sets a new limit on the number of VDNs at 4000. VDNs are configured on Overlay 79.

The VDNs are defined in sets of blocks. Each block may contain any number of contiguous VDNs, as long as the total number does not exceed 4000. Within a block, it is possible to define a range of VDNs as well as individual VDNs. For example, a customer may define the following VDNs (in this example, the customer is defining a total of 164 VDNs.)

7200-7299
7320-7325
7355
7400-7455
7676

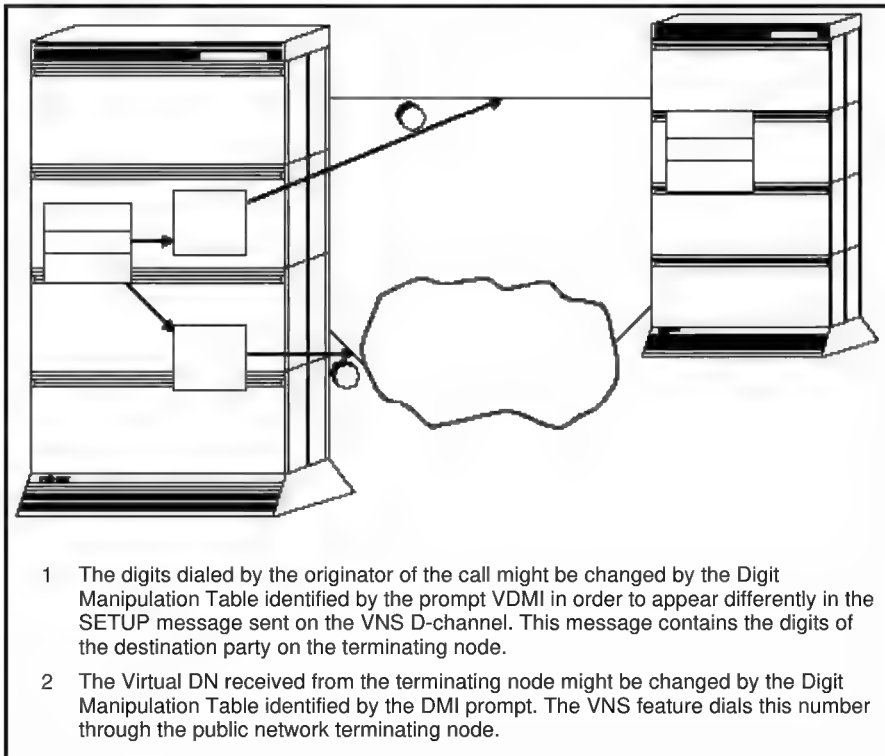
A customer may remove a block of contiguous VDNs, as long as there is no VNS call using a VDN in the block. To remove a block of contiguous VDNs, the block has to be first disabled in Overlay 79 (by entering DIS against the REQ prompt), to prevent new VNS calls from using any of the VDNs in the block. Once the block has been disabled, the system administrator has to wait until all the VNS calls, using any of the VDNs in the block, are cleared.

The system administrator can determine the number of VDNs used by VNS calls, by printing VNS information using the PRT command in response to the REQ prompt in Overlay 79 (note that the block of VDNs must be first disabled.) Once all of the VDNs are free (unused), the block of VDNs may be removed by using the OUT command.

An Electronic Switched Network (ESN) call is identified as being VNS once a valid entry configured when the prompt VNS = YES has been found in a Route List Block (LD 86) used for the digits dialed. A SETUP message is sent to the terminating node on the VNS D-channel. Manipulation of the digits included in the SETUP message is performed, if needed, using the digits dialed and according to the content of the Digit Manipulation Table referenced with the prompt VDMI.

On reception of the SETUP request, the terminating node sends one of its Virtual DNs back to the originating node. The terminating node expects to receive a call for that Directory Number (VDN) from one of its trunks linked to the public network. The originating node, upon reception of the VDN, seizes a trunk and dials a number consisting of the VNS Virtual DN affected by the manipulations defined in the Digit Manipulation Table referenced by the prompt DMI. These manipulations are performed in order to dial the Virtual DN through the public network to the destination node.

Figure 51
Digit Manipulation



Failure of VNS D-channel

If the D-channel is not operable, the VNS route list entry is chosen, and then this entry is bypassed. In a network VNS environment, calls will remain queued at the source node.

If the VNS D-channel fails when a call is established, the call remains established. This is, however, without the ability to use the networking features normally supported by the VNS feature.

Failure of Bearer

Failure of the VNS Bearer trunk results in the VNS call being cleared.

Operating parameters

No new hardware is required for the VNS feature.

VNS requires a contiguous block of existing unused DNs (virtual DNs) at both the originating and the terminating nodes, which are a subset of the DID range of the customer. VNS virtual DNs can be up to seven digits long. A maximum of 100 virtual DNs can be assigned per customer.

VNS D-channel

VNS requires an established D-channel between the originating and terminating nodes for signaling. No intermediate nodes are permitted.

A VNS D-channel belongs to only one customer and cannot be shared by other customers for VNS calls.

VNS does not support Backup D-channels for VNS signaling.

D-channels provided by Basic Rate Interface (BRI) are not supported as VNS D-channels.

VNS reverts back to conventional signaling if the VNS D-channel fails.

VNS Bearer Trunks

Disconnect supervision is mandatory for all trunks, while answer supervision is not. In cases when it is not available, VNS will assume that the Bearer is answered as soon as the “end-of-dialing” timer has expired.

The following trunks are not supported as VNS Bearer trunks:

- Autoterminate trunks; and
- Basic Rate Interface trunks.

Any Incoming Digit Conversion on the incoming VNS Bearer trunk causes a VNS call to fail.

Data calls are supported only if the Bearer supports data calls.

Maximum number of VNS calls

Different elements control the maximum number of simultaneous VNS calls that can be processed by a Meridian 1 system. The number depends on the resources allocated for the VNS feature itself, the resources to be used for the voice path (Bearer trunks) and the resources available for VNS signaling over the D-channel.

For each customer

It is not possible to perform more VNS calls (incoming and outgoing) than the number of Virtual DNs defined for the customer in LD 79.

The number of VNS calls is limited by the number of available Bearer trunks. When all Bearers defined to be usable with VNS are busy, no other VNS calls can be made.

For each D-channel of the customer

The maximum number of VNS calls allowed to use a D-channel is limited by the value defined to the D-channel by the VNSM prompt in LD 17.

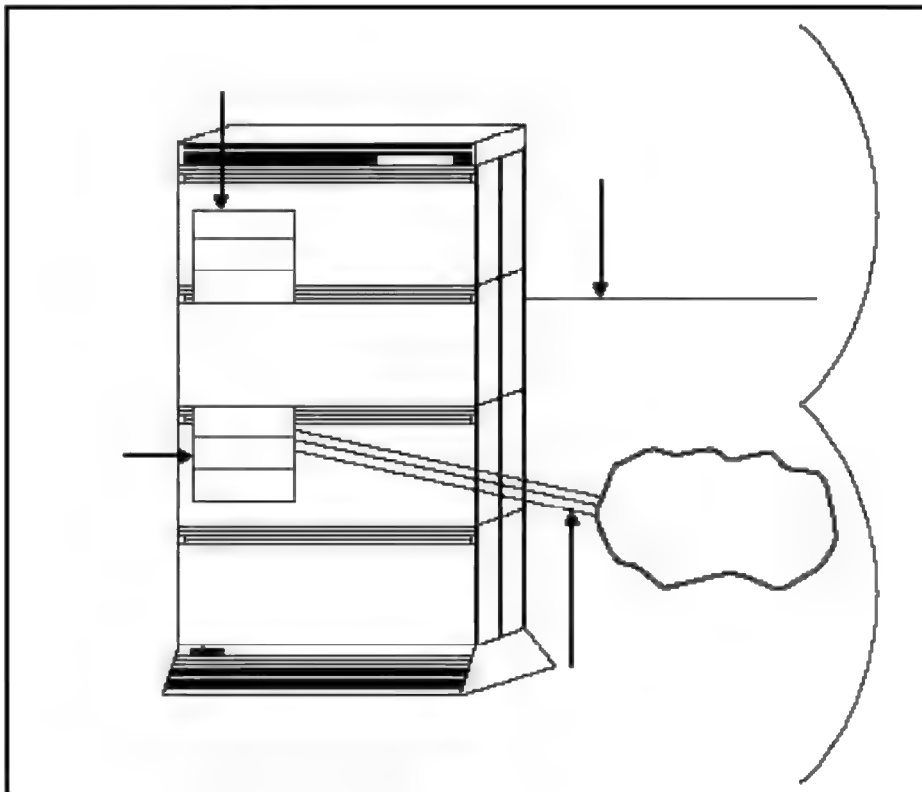
For each entry in a Route List Block

The maximum number of VNS calls that can be performed on a route listed in an entry of a Route List Block in LD 86 is limited by the value entered in response to the VTRK prompt.

On a network level

In the case of a non-symmetrical configuration between originating and terminating VNS nodes, the call limitation imposed by the more restrictive node applies.

Figure 52
VNS Call Limitations



Feature interactions

The following features are supported over VNS routes:

- Attendant Barge-In
- Attendant Break-In
- Attendant Recall with Splitting
- Basic Authorization Code
- Basic Rate Interface/Primary Rate Interface Interworking

- Calling Party Number
- Call Party Name Display
- Call Selection (ICI + loop)
- Console Digit Display
- Control of Trunk Group Access
- Digit Display
- Display of Calling Party Denied
- Electronic Lock Network Wide/Electronic Lock on Private Lines
- Network Attendant Service
- Network Call Redirection
- Network Class of Service
- Network Flexible Feature Codes
- Network Message Center
- Network Message Service to Meridian Mail
- Network Ring Again
- Network Ring Again No Answer
- Originator Routing Calls
- Radio Paging
- Trunk Optimization Before Answer

In addition, VNS has interactions with the following features:

Access Restriction

When a user has trunk access barred (i.e, via Trunk Group Access Restriction (TGAR), New Flexible Call Restriction (NFCR), or Toll Denied Class of Service), the user will still be able to make a VNS call.

If a customer wants users to be toll restricted even for VNS calls, the Minimum Facility Restriction Level (FRL) in the Route List Block (i.e., LD 86) can be used.

Attendant Call

When an attendant extends a call over a VNS network, it is not possible to release the call before the status of the destination is known. This applies regardless of Network Attendant Service (NAS) configuration.

Autoterminate

Autotermination on VNS Bearer trunks is not supported, because a VNS Virtual DN is expected on a VNS Bearer exactly the way it was passed back on the VNS D-channel.

Call Detail Recording (CDR)

Call Detail Recording is supported on VNS routes with the exception of the 911 CDR Improvement and Meridian 911 ANI in CDR features. The CDR output is controlled by the Bearer trunk (i.e., CDR output defines the details of the call made on the Bearer, and not the VNS D-channel). The Calling Line Identity will be output in the CDR record for incoming calls.

Call Pickup Network- Wide

The Call Pickup Network Wide feature will not work in conjunction with the Virtual Network Services feature.

Calling Line Identification

Calling Line Identification is supported on VNS routes. All display information is taken from messages on the VNS D-channel. The VNS Bearer does not drive the display of such information.

Charge Display at End of Call

In the case of VNS calls, no charge information is displayed.

Direct Inward Dialing (DID) Treatment

Since VNS is handling calls as though they were made using ISDN TIE trunks even when VNS DID Bearer trunks are used, the VNS feature does not adhere to the special treatment given to regular DID trunks.

Distinctive Ringing

Except in the case of Network Distinctive Ringing, the Distinctive Ringing feature is not supported by VNS. An incoming call using VNS on a Bearer trunk defined with the prompt DRNG = YES will ignore this value and will perform the same treatment as though the value was DRNG = NO (i.e., no distinctive ringing provided).

Electronic Switched Network (ESN)

The following ESN features are supported on VNS routes:

- ESN Basic Automatic Route Selection
- ESN Coordinated Dialing Plan Routing Enhancement
- ESN Coordinated Dialing Plan
- ESN (999 Loc.)
- ESN Flexible Numbering Plan
- ESN Free Calling Area Screening
- ESN Incoming Trunk Group Exclusion
- ESN Network Authorization Code
- ESN Network Automatic Route Selection
- ESN Network Routing Controls (Time-of-day Scheduling)
- ESN Network Speed Call
- ESN Tone Detection, and
- ESN Off-Hook Queuing.

Incoming Digit Conversion

Since VNS Virtual DNs must be received on the incoming VNS Bearer (DID) trunks, as they are defined at the terminating node, the VNS feature is not supported for routes that perform digit conversion on the digits used for VNS Virtual DNs.

ISDN Call Connection Limitation (ICCL) Checks

The VNS trunk from the external network looks exactly like an ISDN TIE trunk and accordingly is subject to ICCL checks and call restrictions applied thereon.

ISDN QSIG Basic Call

A QSIG link can be used as a B-channel for the Virtual Network Service (VNS) over a private network. All VNS services are supported as normal. QSIG is only used as a speech bearer.

Intercept Treatment

Intercept treatment applied to VNS calls is configured as for TIE trunks.

Network ACD

Network ACD (NACD) is supported by VNS. When a call queued at a source node receives notification that an agent is free and reserved at the target node, a VNS call is made to the target node. At that time, the call is removed from the queue at the source node. The call will continue to receive ringback (or Recorded Announcement (RAN) if configured) while it is waiting for the VNS call to be completed. When an alerting message is received from the target node, the ringback or RAN is removed and the speechpath with the Bearer is connected. The user will thus hear ringback tone (given either by the PSTN or the Meridian 1 at the target node, depending on the Bearer type), until the agent answers the call.

If for some reason the ALERTING message is not received, the user is requeued (at the top of the queue at the source node). Since ringback or RAN were not removed in the first place, the user is unaware that an attempt to reach a remote agent has been made and has failed.

Since PSTN Bearer trunk call establishment may take longer than PRI2 TIE trunk call establishment, it is necessary to allow more time for the call to arrive at the agent's set than provided by the regular NACD feature. The Agent Reservation Timer should be configured to accommodate a longer interval.

If an agent is reserved at the target node, but the call fails to reach that node (e.g., all trunks are busy), the agent will stay reserved until NACD Target Reservation Timer (RAGT) expires (the target node has no indication that the call has encountered a busy condition). This is more critical when NACD is used with VNS, because (RAGT) must be set to a greater value.

NACD allows up to 20 remote target nodes to be defined in the routing tables. Since the maximum number of VNS Virtual DNs per customer is 100, it is not realistic to configure 20 target nodes using VNS routing: this would only allow five Virtual DNs per target node and thus a maximum of five simultaneous calls.

Network Call Party Name Display

Network Call Party Name Display is supported on VNS routes. All display information is taken from messages on the VNS D-channel. The VNS Bearer does not drive the display of such information.

Network Distinctive Ringing

For an incoming DID call (without VNS) that tandems to another node using VNS, the feature will be supported as it would have been if an ISDN TIE trunk had been used for the VNS call.

Trunk Barring

Three cases apply for Trunk Barring:

- 1 When the second trunk involved in the call is used by VNS, no trunk barring is applied regardless of the configuration of the first trunk. The call is always allowed to get through.

Note: This implementation completely overrides the Trunk Barring feature.

- 2 When the first trunk involved in the call uses VNS, and the second one is not used by VNS, trunk barring is performed according to the content of the default Access Restriction Table (ART) for the TIE trunk.
- 3 When neither the first trunk nor the second trunk is involved in a VNS call, the usual rules for Trunk Barring apply.

Vacant Number Routing

Calls rerouted by the Vacant Number Routing feature are not allowed to have digit manipulation performed on the DN dialed. Thus, for non VNS calls, no Digit Manipulation Index (DMI) can be associated in the Route List Index (RLI) used by Vacant Number Routing. For VNS calls (in LD 86, the entries on this RLI are defined with the prompt VNS = YES), it is not allowed to associate any manipulation on the digits included in the messages exchanged over the VNS D-channel. In these cases, the prompt VMDI is not displayed, but the prompt DMI is still displayed.

Feature packaging

The Virtual Network Services (VNS) package is 183.

The following software packages are also required for VNS:

- Network Alternate Route Selection (NARS) package 58, dependent on:
 - Basic Routing (BRTE) package 14; and
 - Network Class of Service (NCOS) package 32;
- Integrated Services Digital Network (ISDN) package 145;
- Integrated Services Digital Network Supplementary (ISDNS) package 161;
- ISDN Signaling Link (ISL) package 147; and
- Advanced Network Services (NTWK) package 148.

Feature administration

LD 17 – Configure Virtual Network Services.

Prompt	Response	Description
REQ	NEW, CHG	New, or change.
TYPE	ADAN aaa xx	Release 19 gate opener. DCH 0 - 15
...		

- USR	VNS SHAV	To define a D-channel used for Virtual Network Services (or ISLD). To define a D-channel shared between PRI and VNS (and ISLD).
- VNSM	0-100	Define the maximum number of VNS channels over the D-channel.
- VNCS	0-31	Virtual Network Services Customer number.
- VNPS	0-32700	Private Network Identifier (PNI) of the far end customer.
- VNCA	YES	Network Call Party Name Display is available over this D-channel for VNS.
- VCRD	YES	Network Call Redirection is available over this D-channel for VNS.
- VTRO	YES	Trunk Route Optimization before answer is available over this D-channel for VNS. This prompt is optional and is not a prerequisite for VNS.

The following steps describe how to:

- Add or create a new single VDN or a block of contiguous VDNs
- Remove a single VDN or a block of contiguous VDNs
- Disable or enable a block of VDNs, or print VNS information for a customer

LD 79 - Add or create a new single VDN or a block of contiguous VDNs.

Prompt	Response	Description
REQ	NEW	Add or create a new single VDN or a block of contiguous VDNs. Note: The CHG command is not supported; you must use the NEW command to enter information.
TYPE	VNS	Virtual Network Services.
CUST	0-31	Customer number.

VNDN	xx...x 1-4000 xx...x <CR>	Individual VDN to be added. 1-4000 = number of contiguous VDN to be added xx...x = first VDN to be added. You may add another single VDN or a block of contiguous VDNs by entering <CR> after the VNDN entry. VNDN is prompted until <CR> is entered. In this case, the REQ prompt will appear again. Note: For the above entries, the VDNs must be part of the customer's numbering plan.
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LD 79 - Remove a single VDN or a block of contiguous VDNs, or remove all existing VDN data blocks.

Prompt	Response	Description
REQ	OUT	Remove a single VDN or a block of contiguous VDNs, or remove all existing VDN data blocks. Note: You cannot remove only certain VDNs from a block; you have to remove the entire block.
TYPE	VNS	Virtual Network Services.
CUST	0-31	Customer number. At least one D-Channel must be configured with USR = VNS or USR = SHAV and having VNS = customer number.
VNDN	XALLVDNS xx...x <CR>	Remove all VNS data blocks. Remove an individual VDN, or the first VDN of a block of contiguous VDNs. You may remove another single VDN, or a block of contiguous VDNs, by entering <CR> after the VNDN entry. VNDN is prompted until <CR> is entered. In this case, the REQ prompt will appear again. If XALLVDNS is entered, the message REMOVE ALL VDN BLOCKS? is then output, followed by the CONF prompt.
CONF	YES	To confirm the removal of all VDN blocks.

LD 79 – Disable or enable single VDN, or a block of contiguous VDNs.

Prompt	Response	Description
REQ	DIS ENL	Disable a single VDN or a block of contiguous VDNs Enable a single VDN or a block of contiguous VDNs
TYPE	VNS	Virtual Network Services.
CUST	0-31	Customer number. At least one D-Channel must be configured with USR = VNS or USR = SHAV and having VNS = customer number.
VNDN	xx....x <CR>	Individual VDN, or first VDN of a block of contiguous VDNs to be disabled or enabled. You may enable or disable another single VDN, or a block of contiguous VDNs, by entering <CR> after the VNDN entry. VNDN is prompted until <CR> is entered. In this case, the REQ prompt will appear again.

LD 79– Print VNS information for a customer.

The information is output after the customer number is entered in response to the CUST prompt.

Prompt	Response	Description
REQ	PRT	Print VDN information.
TYPE	VNS	Virtual Network Services.
CUST	0-31	Customer number. At least one D-Channel must be configured with USR = VNS or USR = SHAV and having VNS = customer number.

		The VNS information is output for the customer. For a range of VDNs, the first VDN is displayed, followed by “—” and the last VDN of the block. On the same line, the number of VDNs in the block is displayed in brackets. For a single VDN, the VDN is displayed followed by “(1)”. If a block is disabled, the above indication is followed by the number of VNS calls still using a VDN in the block. These calls have to be cleared before the VDN block can be removed. At the end, the total number of VDNs configured for the customer is output. A sample output could be: <pre>7676 (1) 8100-8199 (100) TOTAL NUMBER OF VDN FOR CUST 2: 101</pre> If the VDN block 8100-8199, containing 100 VDNs, is disabled, the output would be: <pre>7676 (1) 8100-8199 (100) *DISABLED - VDN USED: 2* TOTAL NUMBER OF VDN FOR CUST 2: 101</pre> In this case, the VDN block is disabled and two VNS calls are still using two VDNs. These two calls must first be cleared before the VDN block 8100-8199 can be removed.
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LD 86 – Assign D-channel number and VNS digit manipulation index to be used when signaling on the Bearer trunk and on the D-channel.

Prompt	Response	Description
REQ	NEW, CHG	New, or change.
...		
ENTR	0-63	Entry number for NARS/BARS Route List.
ROUT	0-511	The number of the route to be associated with the VNS Bearer channel.
VNS	YES	Virtual Network Services.

VDCH	0-15	The D-channel used for these VNS calls (must be configured in LD 17).
VDMI	xxx	The Digit Manipulation Table to be used on the VNS D-channel.
	(0)	No digit manipulation required.
	1-31	For Coordinated Dialing Plan feature.
	1-255	For NARS/BARS.
VTRK	1-(20)-100	Number of VNS trunks allowed on the route.
DMI	xxx	The Digit Manipulation table to be used on the VNS Bearer.
	(0)	No digit manipulation required.
	1-31	For Coordinated Dialing Plan feature.
	1-255	For NARS/BARS.

LD 16 – The following TIMR, TIMR, and VRAT prompts have been added to this overlay:

Prompt	Response	Description
REQ	NEW, CHG	New, or change.
TYPE	RDB	Route Data Block.
CUST	0-31	Customer number.
ROUT	0-511	The number of the route to be associated with the incoming VNS Bearer channel.
CNTL	YES	Change control of timers.
- TIMR	VSS (0) 1 2-1023	VNS Set Speechpath Timer 0 = Do not answer the bearer channel until the terminating party answers. 1 = Answer the Bearer channel immediately on arrival. 2-1023 = Answer the Bearer channel after specified seconds (rounded down to two-second multiples) if the terminating party has not already answered.
- TIMR	VGD 0-(6)-31	VNS Guard Timer The time allowed for the Bearer trunk call to disconnect, in seconds. This is a guard timer on the associated VNS DN.

...		
VRAT	(NO) YES	VNS Return Attendant Tones Option Do (not) answer an attendant extended call over VNS immediately on the incoming Bearer trunk.

Feature operation

There are no operating procedures specified for this feature.

Virtual Network Services Virtual Directory Number Expansion

Virtual Network Services (VNS) provides ISDN features to customers when no ISDN Primary Rate Interface (PRI) or ISDN Signaling Link (ISL) Bearer Channels are available between two Meridian 1 switches (Please refer to the VNS feature description module in this NTP for detailed information on VNS).

A requirement of VNS is that customers have to configure VNS DNs (VDNs) as part of their numbering plan. The VNS VDN expansion feature sets a new limit on the number of VDNs at 4000. VDNs are configured on Overlay 79.

The VDNs are defined in sets of blocks. Each block may contain any number of contiguous VDNs, as long as the total number does not exceed 4000. Within a block, it is possible to define a range of VDNs as well as individual VDNs. For example, a customer may define the following VDNs (in this example, the customer is defining a total of 164 VDNs.)

```

7200-7299
7320-7325
7355
7400-7455
7676

```

A customer may remove a block of contiguous VDNs, as long as there is no VNS call using a VDN in the block. To remove a block of contiguous VDNs, the block has to be first disabled in Overlay 79 (by entering DIS against the REQ prompt), to prevent new VNS calls from using any of the VDNs in the block. Once the block has been disabled, the system administrator has to wait until all the VNS calls, using any of the VDNs in the block, are cleared.

After disabling the block, the system administrator can determine the number of VDNs used by VNS calls by printing VNS information (by using the PRT command in response to REQ in Overlay 79). Once all of the VDNs are free, the block may be removed by using the OUT command.

Operating parameters

None applicable.

Feature interactions

None applicable.

Feature packaging

The VNS VDN expansion feature requires the Virtual Network Services (VNS) package 183.

The following software packages are also required:

- Network Alternate Route Selection (NARS) package 58, dependent on:
 - Basic Routing (BRTE) package 14, and
 - Network Class of Service (NCOS) package 32;
- Integrated Services Digital Network (ISDN) package 145;
- Integrated Services Digital Network Supplementary (ISDNS) package 161;
- ISDN Signaling Link (ISL) package 147;
- Advanced Network Services (NTWK) package 148; and
- 1.5 Mbps PRI (PRA) package 146 is required if VNS uses the D-Channel of a PRI trunk for its signaling (USR = SHAV).

Feature implementation

The following steps describe how to:

- Add or create a new single VDN or a block of contiguous VDNs;
- Remove a single VDN or a block of contiguous VDNs;
- Disable or enable a block of VDNs, or print VNS information for a customer.

LD 79 - Add or create a new single VDN or a block of contiguous VDNs.

Prompt	Response	Description
REQ	NEW	Add, or create a new single VDN or a block of contiguous VDNs. Note: The CHG command is not supported; you must use the NEW command to enter information.
TYPE	VNS	Virtual Network Services.
CUST	0-99 0-31	Customer Number for Options 51C, 61C, 81, 81C. Customer Number for Option 11C. At least one D-Channel must be configured with USR = VNS or USR=SHAV and having VNS = customer number.
VNDN	xx...x 1-4000 xx...x <cr>	Individual VDN to be added. 1-4000 = number of contiguous VDN to be added xx...x = first VDN to be added. You may add another single VDN or a block of contiguous VDNs by entering <cr> after the VNDN entry (VNDN is prompted until <cr> is entered.) In this case, the REQ prompt will appear again. Note: For the above entries, the VDNs must be part of the customer's numbering plan.

LD 79 - Remove a single VDN or a block of contiguous VDNs, or remove all existing VDN data blocks.

Prompt	Response	Description
REQ	OUT	Remove a single VDN or a block of contiguous VDNs, or remove all existing VDN data blocks. Note: You cannot remove only certain VDNs from a block; you must remove the entire block.
TYPE	VNS	Virtual Network Services.
CUST	0-99 0-31	Customer Number for Options 51C, 61C, 81, 81C. Customer Number for Option 11C. At least one D-Channel must be configured with USR = VNS or USR = SHA V and having VNS = customer number.
VNDN	XALLVDNS xx...x <cr>	Remove all VNS data blocks. Remove an individual VDN, or the first VDN of a block of contiguous VDNs. You may remove another single VDN, or a block of contiguous VDNs, by entering <cr> after the VNDN entry (VNDN is prompted until <cr> is entered.) In this case, the REQ prompt will appear again. If XALLVDNS is entered, the message REMOVE ALL VDN BLOCKS? is then output, followed by the CONF prompt.
CONF	YES	To confirm the removal of all VDN blocks.

LD 79 – Disable or enable single VDN, or a block of contiguous VDNs.

Prompt	Response	Description
REQ	DIS ENL	DIS = disable a single VDN or a block of contiguous VDNs ENL = enable a single VDN or a block of contiguous VDNs
TYPE	VNS	Virtual Network Services.
CUST	0-31	Customer Number for Option 11C. At least one D-Channel must be configured with USR = VNS or USR = SHAV and having VNS = customer number.
VNDN	xx....x <cr>	Individual VDN, or first VDN of a block of contiguous VDNs to be disabled or enabled. You may enable or disable another single VDN or a block of contiguous VDNs, by entering <cr> after the VNDN entry (VNDN is prompted until <cr> is entered.) In this case, the REQ prompt will appear again.

LD 79– Print VNS information for a customer.

The information is output after the customer number is entered in response to the CUST prompt.

Prompt	Response	Description
REQ	PRT	PRT = print VDN information.
TYPE	VNS	Virtual Network Services.
CUST	0-31	Customer Number for Option 11C. At least one D-Channel must be configured with USR = VNS or USR = SHAV and having VNS = customer number.

		The VNS information is output for the customer. For a range of VDNs, the first VDN is displayed, followed by “—” and the last VDN of the block. On the same line, the number of VDNs in the block is displayed in brackets. For a single VDN, the VDN is displayed followed by “(1)”. If a block is disabled, the above indication is followed by the number of VNS calls still using a VDN in the block. These calls have to be cleared before the VDN block can be removed. At the end, the total number of VDNs configured for the customer is output. A sample output could be: <pre>7676 (1) 8100-8199 (100) TOTAL NUMBER OF VDN FOR CUST 2: 101</pre> If the VDN block 8100-8199, containing 100 VDNs, is disabled, the output would be: <pre>7676 (1) 8100-8199 (100) *DISABLED - VDN USED: 2* TOTAL NUMBER OF VDN FOR CUST 2: 101</pre> In this case, the VDN block is disabled and two VNS calls are still using two VDNs. These two calls must first be cleared before the VDN block 8100-8199 can be removed.
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LD 17 – Define the maximum number of VNS channels supported by a D-Channel.

Prompt	Response	Description
REQ	CHG, END	Change, or exit LD 17.
TYPE	ADAN	Action Device and Number.
- ADAN	CHG DCH 0-63 CHG DCH 0-15	The D-Channel number for Options 51C, 61C, 81, 81C. D-Channel number for Option 11C.
...		
- USR	VNS, SHAV	VNS = dedicated VNS D-Channel SHAV = shared VNS D-Channel
...		
- - VNSM	1-300	Maximum number of VNS channels supported by the D-Channel. Note: This is the potential VNS capability for the D-Channel and is not associated with other restrictions placed on VNS capability, such as the number of VDNs.

LD 86 – Define the maximum number of VNS trunks allowed on the route list entry.

Prompt	Response	Description
REQ	NEW, CHG	New, or change.
CUST	0-31	Customer Number.
FEAT	RLB	Route list data block feature.
RLI	0-MXRL	The Route List Index to be associated with the VNS Bearer Channel.
ENTR	0-63	The entry within the Route List Index to be associated with the VNS Bearer Channel.
ROUT	0-511	The number of the Route to be associated with the VNS Bearer Channel.
VNS	YES	Virtual Network Services.
...		
VTRK	1-(20)-254	Number of VNS Trunks allowed on the route.

Feature Operation

No specific operating procedures are required to use this feature.